BROWNE

MYOGRAPHIA

NOVA

1698

15695/D

Myographia Nova:
OR, A
Graphical Deſcription
Of All The
MUSCLES
IN THE
HUMANE BODY,
As they ariſe in Diſſection:

Diſtributed into Six Lectures.

At the Entrance into which,
Are Demonſtrated the proper *Muſcles* belonging to each *Lecture*, now in General Uſe at the *Theatre* in *Chirurgeons-Hall*, *London*, and Illuſtrated with Two and Forty *Copper-Plates* accurately Engraven after the Life, not only with their *Names*, but their *Uſes*, fairly delineated on each Plate, as much as can be expreſt by *Figures*; with an Explanation of their *Names* throughout the whole Diſcourſe; as alſo with their *Originations*, *Inſertions*, and *Uſes*, at large, in their proper *Deſcriptions*, and various uſeful *Annotations*, and curious *Obſervations* both of the *Author's*, and other *Modern Anatomiſts*.

TOGETHER
With a Philoſophical and Mathematical Account of the **Mechaniſm of Muſcular Motion**, and an Accurate and Conciſe Diſcourſe of the **Heart** and its **Uſe**, with the **Circulation** of the **Blood**, &c. and with a compleat Account of the *Arteries* and *Veins*, as to their outward *Coats*, proving them to be made with *Circular Fleſhy Fibres*, by whoſe Contractions their *Trunks* become Narrowed, and the *Fluid Particles* of the *Blood* are ſent forwards into all the Parts of the *Body*.

Digeſted into this New Method,
By the Care and Study of *JOHN BROWNE*, Sworn Chirurgeon in Ordinary to the King's Moſt Excellent MAJESTY, and late Senior Chirurgeon of St. *Thomas*'s Hoſpital, *Southwark*.

Per varios Caſus Artem Experientia fecit,
Exemplo monſtrante Viam. ———

LONDON,
Printed by *Tho. Milbourn* for the AUTHOR, 1698.

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TO THE
King's Moſt Excellent Majeſty, William III.

May it pleaſe Your MAJESTY,

THE meaneſt, but moſt Loyal of your Subjects and Servants begs leave Humbly to Proſtrate himſelf at Your *Sacred Feet*, and to ſhroud this *Muſcular Treatiſe* under Your moſt Auſpicious Protection: Your *Majeſty* is the beſt Judg of what is, or may be uſeful to the Publick good; being exquiſitely skill'd in all the Arts both of War and Peace: And ſince it hath always been one part of Your Illuſtrious Character, to be an Encourager of Induſtry, and a Favourer of Ingenuous Arts, I hereby have been emboldned to preſent my poor Labours to your moſt Judicious View.

I am not ſo vain as to imagine that what I have here written, will make any addition to Your moſt Comprehenſive Knowledge; if I ſhall be able to correct ſome groſs Errors, which ſome of my own profeſſion have fallen into, and in ſome Particulars enlarged the boundaries of *Anatomical* Science, I ſhall ſufficiently have attained my End.

May that God, who hath given you the Victory over your Enemies, as well as the Hearts of your Subjects, ſtill continue to proſper your Generous Undertakings, to Heal Our Breaches and Diviſions, and at laſt, to Your Earthly Crown add a laſting Immortality, is the dayly Prayer of,

YOUR MAJESTY's
Moſt Loyal Subject, and moſt Obedient Servant,
JOHN BROWNE.

TRactatus hic, cui Titulus, MYOGRAPHIA NOVA;
Or a *Graphical Deſcription of all the Muſcles*, &c.

IMPRIMATUR:

Thomas Millington, Præſes,

Thomas Burwell,
Richard Torleſſe,
William Dawes,
Thomas Gill,
} Cenſores.

Datum ex Ædibus Collegij noſtri,
Sept. 27. 1698.

I*Coniſmos hoſce Anatomicos, de Univerſis Corporis Humani Muſculis, tàm in Situ Naturali, quam extrà ſitum poſitis; cum eorum Nominibus, Uſibuſq; nec non propriis cuique adjunctis, Summo Artificio, à* Joanne Browne, *Regio Chirurgo Ordinario expreſſos, ad vivum delineatos; unà cum Tractatu Cordis, Circulatione Sanguinis, Motu Muſculari, variiſq; Obſervationibus de Arteriis, & Venis, &c. Omnibus Anatomes Studioſis, Omnibuſq; Medicinæ, Chirurgiæq; Tyronibus, perutiles eſſe Judicamus.*

Samuel Collins, M. D. Socius & Elector, Nuperq; Præſes Celeberimi Collegii Medicorum Londinenſium Anatomes, Chirurgiæq; Profeſſor Lumlienſis.

Thomas Gardiner, Chirurgus Serv' ad Regem, ejuſq; Chirurgus Domeſticus Ordinarius, & Societatis Chirurgorum Londinenſium Magiſter.

Thomas Lichfield, Chir. & ejuſdem Societatis Guardianus.

Thomas Page, Chir.
William Layfield, Chir.
Roger Knowles, Chir.
} Ejuſdem Societatis Chirurgorum *Londinenſium* Gubernatores.

William R.

WILLIAM *the Third, by the Grace of God,* KING *of* England, Scotland, France *and* Ireland, *Defender of the Faith,* &c. *To all Our Loving Subjects, of what Degree, Condition or Quality ſoever, within our Kingdom and Dominions, Greeting; Whereas it hath been manifeſted unto Us, that Our Truſty and Well-beloved* JOHN BROWNE, *Eſq; one of Our* Chyrurgeons *in Ordinary, hath not only with great Art, but at the Expence of much time, Delineated, Deſcribed, and Accurately Engraved in Copper Plates,* A Graphical Deſcription of all the MUSCLES in Humane Body; *which Performance of His, is to Our great Liking and Satisfaction: So that We may expreſs Our Approbation thereof, and give them all due and ample Encouragement for the future, We do hereby ſignifie Our Royal Pleaſure, Granting unto the ſaid* JOHN BROWNE, *the ſole Priviledge of Printing the aforeſaid* Treatiſe, *with its Copper Figures Accurately Engraved after the Life, with their Names on the* Muſcles, &c. *And ſtrictly Charging, and Forbidding all our Subjects, to Copy or Counterfeit any of the Sculptures or Deſcriptions, either in great or ſmall, or to import, Buy, Vend, Utter or Diſtribute any Copies, or Examplers of the ſame Reprinted beyond the Seas, within the Term of Fifteen Years enſuing the Date of this Our Licence and Prohibition, without the Conſent and Approbation of the ſaid* JOHN BROWNE, *his Heirs, Executors, or Aſſigns, as they and every of them ſo offending, will Anſwer the contrary at their utmoſt Perils: Whereof, as well the* Wardens *and* Company of Stationers *of our* City of London, *the* Farmers, Commiſſioners, *and* Officers *of Our* Cuſtoms, *as all other Our* Officers *and* Miniſters *whom it may concern, are to take particular Notice, That due Obedience be given to this our Royal Command. Given at Our* Court *at* Kenſington *the* 25th. *Day of* October, 1696. *in the Eighth Year of Our Reign.*

By His MAJESTY's Command,
WILL. TRUMBULL.

To the Rt. Honourable Robert *Earl of* Sunderland, *Baron* Spencer *of* Wormleton, Knight *of the Moſt Noble Order of the* Garter, *and One of the Lords of His* Majeſty's *moſt Honourable Privy Councel.*

MY LORD,

AS I have ſpent a great part of my Life, in conſidering the *Structure*, *Actions*, and *Uſes* of all the *Muſcles in Humane Body*, which have been as well delightful to me in the *Contemplation*, as very uſeful to me in my way of *Practice*; So I am not without ſome Hopes, that my Labours may find a favourable Reception amongſt all the Ingenuous Lovers of theſe Studies, but eſpecially with the men of my own Profeſſion, to whom the Knowledge of this part of *Anatomy* is ſo abſolutely neceſſary, that they can neither skilfully nor ſucceſsfully perform many Operations in Chirurgery without it: And tho' My Lord, after all my Care to improve and finiſh this Undertaking, I am ſufficiently ſenſible, how unworthy this my laſt Performance, is to have *Your Great Name* prefixt before it: Yet I have no Reaſon to doubt of *Your Lordſhips* candid Interpretation of what I have done, craving no Protection againſt the Detraction of thoſe cenſorious Perſons, who think to raiſe themſelves upon the Ruines of other mens Credit and Reputation, and to be taken for more ſagacious Men, than their Neighbours, by cavilling and ſnarling at other mens Works, without making thoſe fair and equitable allowances which all men, who are liable to be miſtaken, ought to do to one another: To whom I ſhall therefore apply that of the Poet *Martial.*

Carpere vel noli noſtra, vel ede tua;
Either deſiſt from carping Ours,
Or let the World ſee what are Yours.

If indeed within the Compaſs of this Epiſtle, I ſhould attempt to give *Your Lordſhips Character* to the World, with which it is ſo well acquainted already, I ſhould juſtly incur the Cenſure of Greater men, than the *Criticks* I have to deal with; ſince ſcarce any thing I am able to ſay on this Subject, but would fall ſhort of a true Deſcription of your large and comprehenſive Knowledge in general, and how well you underſtand the *State* and *Intereſt*, *Strength* and *Policy* of all the Kingdoms of *Europe* in particular, and what Meaſures are moſt proper to be taken, to keep the Ballance even amongſt them. His preſent *Majeſty*, the beſt *Judge* of Merit, by rewarding your Concern for the ſafety of your *Country* and his *Service*, has openly juſtifyed your Conduct to the World, and therefore I am ſecure from the Imputation of being bribed into *Flattery*, whilſt I only deliver the Sentiments of ſo *Wiſe* and ſo *Great* a *King*.

It would be injurious to the publick *Good*, to detain *Your Lordſhip* any longer from Your weighty Buſineſs and important affairs; if what I have writ and expoſed to publick View, may afford *Your Lordſhip* any Diverſion at Your leaſure Hours, and in ſome Meaſure anſwer the Encouragement of ſo Noble a *Patron*, I ſhall think my ſelf both highly honoured and rewarded for my Pains, and ſhall omit no Opportunity of teſtifying how much I am,

MY LORD,

Your Lordſhips

Moſt Faithful, and moſt Obedient Servant,

JOHN BROWNE.

THE PREFACE.

Kind Reader,

I Know it has more than once been diſputed, whether an *Author* may be allow'd a *Competent Judge* of his Own Writings; and that tho' as to the Building and Contrivance, he may be in the right; (that being the Employment of his Own *Genius*) yet the Ornamental part thereof, as it is the *Brat* of *Fancy*, receives but a very ſmall meaſure, if any at all, (either as to its own Merits or Failures) from the *Judgment*.

And ſince I every where find, that he is not to be accounted an *Vnprofitable Member* of a *Common-Weal*, by whoſe Care and Study others may be rais'd, and enlarge on the ſame Subject with much more Perfection: And tho' I may come abroad once more with an Ayr not agreeable to all Humours (well knowing that it's eaſier to *divert* than *pleaſe*) the firſt darting like *Flaſhes ſtriking* on the *Fancy*, whilſt the other more readily *yields* to the *Severity* of *Judgment* and *Cenſure*: Yet in this I am ſatisfied, as I have not Concern enough in me to write any thing in my own behalf, or defence, ſo ſhall I not ſtudy the *Gratification* or *Itch* of any *Adverſary* whatſoever. And tho' I am readily convinc'd, that the beſt of *Authors* may ſometimes miſtake, after his greateſt Care and Study, yet I do by no means think him the better Man, that makes this an Advantage for carping at him: Altho' I muſt confeſs, we live in an Age ſo *critical*, and ſo *ſevere*, that even the *Softeſt Ayrs* are unpleaſant to ſome ſorts of People, and very *harſh* and *untunable* to the Ears of others. And ſince I am well ſatisfied, that it has been my Misfortune to meet with ſome Enemies of the *Plaiſter-box*, who with no ſmall Confidence have ſpread abroad, (in hopes of doing me an Injury) that I am not *Maſter* of that which I *print* under my own *Hand* and *Name*: Yet I can tell them, tho' I may want *Wit* and *Parts* to *illuſtrate* my *Writings*, as ſome Men may do, yet I have more *Honeſty* than to *impoſe* upon the *Publick*, or break into any Man's *Province* without his Leave; in that where-ever I have made uſe of any *Author* in this my Diſcourſe, I have nam'd him either in the *Elenchus* or *Deſcription*, or in my *Obſervations*, where there have been moſt occaſion to mention him.

And ſince nothing but a Command, which I could not reaſonably diſobey, could have given me freſh Courage of coming abroad with this *Laſt Edition* of *Muſcles*, I could not think my Duty fully paid, till I had comply'd with the Deſires of thoſe *Venerable*, as well as *Learned Men*, who have engag'd me in it. And tho' in its ſelf, I am well ſatisfied, it may carry but little Merit to ſecure it from the ſnarling of *Criticks*, (with whom it's as natural to bark as to breath) yet being under the *Vmbrage* of ſo *Impartial Judges*, I think both *it* and *my ſelf* happily *ſhelter'd* by thoſe, who beſt underſtand whether it carries any Intrinſick Value in it, or not.

Having brought my ſelf thus far into the *Preface*, my next Deſign is, to enquire into the Subject matter of the ſubſequent Diſcourſe, and that is, *The Anatomy of Human Body*, or, *The Deſcription of the Muſcles* of that *Man*, whoſe *Firſt Founder* and *Builder* was the *Almighty*, who gave this *Epitome* of the World, that *living Fountain* of *Blood* and *Spirits*, which was ſufficient to water and bedew all its parts with Warmth and Life throughout all the *Stages* of Life: That *Man*, whom the *Great Jehovah* breath'd Life into his Noſtrils, and made him a *living Creature*; he that from the firſt was made the *Prince* of the *Univerſe*, and the *Great Comptroller* over all other *Creatures*, to whom all other *Beings* do pay their *Obedience*, and from whom they receive all their Meaſures and Boundaries of *Government* and *Uniformity*: That *Man*, who had at his command all the ſublunary Bleſſings he could wiſh for, and what his Soul could deſire: Yet this is the ſame Man, who (by his Fall) hath made himſelf the true *Son of Sorrow*, the *Patron* of *Diſeaſes*, and the *Subject* of *Outward Accidents*. For, ſhould we again take this *Great Man*, under his moſt flouriſhing Capacity, and allow him *Maſter* of ſome Thouſands of *Acres*; what tho' he is daily tranſported with the pleaſant Harmony of *Philomels*, ſinging pleaſant and melodious Tunes in his *Woods* and *Groves*, and could challenge all thoſe innocent *Maſters of Muſick* to divert him at pleaſure; tho' he may glut his Senſes with Variety of Sweets aſcending from his own Gardens, and may live in a *fine Palace* curiouſly ſet out with the *Embroidery* of delightful *Tapeſtry*, yet not one of theſe will yield him any relief in the *ſharp pains* of the *Gout*, or quit him from One Fit of the *Stone*, or the *Collick*. Nay, how oft have we ſeen many *Great men*, otherwiſe careſs'd with theſe *Mundane* Bleſſings, even become their own *Priſoners*, and cloſe chain'd to their *Beds* of Sickneſs, in the midſt of their Enjoyments; and under the name of living, have ſhrivel'd out their Blood and Spirits into a *Series* of creeping Diſtempers, and by Time and Sickneſs have become nothing more than *walking Skeletons*? How oft have we ſeen *Young*, tho' *Great* Men, who have juſt arriv'd at the flower of their Age, and the wiſh'd-for fruition of their Fortunes, who in a few days have been ſent to the dark Chambers of their Graves, by the *Violence* of a ſurprizing *Fever*, whilſt others at once have been daſh'd to pieces with the ſudden ſtroke of an unexpected *Apoplexy*? This is the very Man, while living, that we do make it our Care and Study to keep up in repair from Diſeaſes, and ſecure from Accidents; and whoſe *Muſcles*, when dead, we preſume to diſſect, and deſcribe in this our following Diſcourſe.

And ſince *Reaſon* and *Experience* have ever been the two ſubſtantial *Legs* on which all Men of *Arts* and *Sciences* have rais'd the *Compage* and Structure of their Studies; ſo alſo have they, in all Ages, been granted the beſt *Supporters* of *Medicine* and *Anatomy*. And ſince it is generally allow'd, that *Experience* makes an *Artiſt*, and that *Reaſon* gives him a *Perfection*, ſo of conſequence it muſt be granted, that both together qualifies him for the advantage of *Obſervation*.

And becauſe the opening of one Body is not ſufficient to diſcover to us the inward and outward parts, as they are truly ſituated, or variouſly planted, *Hiſtory* hath been ſo much our Friend, as to collect various *Obſervations* for our Improvement; where, by the uſe of the Knife, and the opening of many Bodies, we at length of Time are ſeen to arrive at ſome Maſtery in the Art of *Diſſection*.

And whereas *Galen* aſſures us, that *Experience* is truly purchaſed by frequent *Obſervation*, and carefully retaining thoſe things which appear to our view, (it being almoſt impoſſible for us to forget that which is ſo oft reiterated to us) ſo can we not properly allow that to be *Experimental* Knowledge, whoſe Singulars are not accompanied with a frequent *Obſervation*, made good to us either by *Inſpection*, *Autopſie*, or a *Tranſition* to the like. Hence was it that the ſame *Galen* affirms in another place, that *Obſervation* doth preſerve the *Memory*; that *Memory* ſets *Experience* to work; and, that both together being rightly weigh'd and manag'd, do give the firſt ſtep to *Art*. And indeed, it is from hence that ſo many *excellent* and *uſeful Obſervations* have been drawn from the due exerciſe and proper uſe of *Medicine* and *Anatomy*, eſpecially where the Cauſes of Diſeaſes have been obſcure, or the Cure thereof difficult.

And whereas *Quacks* and *Emperical Pretenders* do generally boaſt, that *Experience is the Fortunate Miſtreſs*, which has all-along conducted them with Security in their *Practice*, *Men of Learning* have never thought it a Crime to make uſe of *Reaſon*, as well as E*xperience*, both in their *Studies*, and in their *Practice*; they very well knowing, that *Experience* hath ſometimes fail'd, where it hath not been back'd and ſupported with *Reaſon*. And this made *Seneca*, *lib. de Benef. 6. cap.* 18. affirm, "That there are "many *Fortuitous* Cures, or Cures done by Chance, which in no reſpect "ought tolerably to be allow'd Remedies, any otherwiſe than we grant "him who is troubled with an *Ague* cur'd by being ſurprizingly puſh'd "into the Water, where the Fright more properly may be ſaid to be the "occaſion of his Cure, than any certain Remedy for the ſame. The ſame may be ſaid of *Quacks in Anatomy*, when we can ſee bold *Pretenders*, who ſcarce knows a *Muſcle* from a *Cockle*, ſhall with more Confidence than Skill undertake thoſe difficult Caſes, which Men of Art do refuſe to be concern'd with. Such are moſt of our *Mountebanks*, who do undertake to Couch *Cataracts*, and yet are altogether as ignorant of the Fabrick and Make of the *Eye*, and of its Muſcles, Coats, and Humours, as are thoſe they ſo confidently undertake to Cure. But this ought not to be ſaid of all Men, who undertake this *Curious Art* of *Couching*; for We, at this day, have a *Countryman* of our own, ſo Expert, and ſo Dexterous at this Art, that no *French-man*, or any other Outlandiſh Pretender whatſoever, can be allow'd to perform that Operation more dexterouſly, or more ſafely, than himſelf; and this is Mr. *WILLIAM READ*, Sworn Oculiſt in Ordinary to His Sacred Majeſty; it being as a Signal of His Royal Favour, in encouraging ſo *Curious* a *Hand* in ſo *Admirable* an *Art*, who, in the preſence of divers of His Majeſty's *Phyſicians*, and others, hath and does perform this Operation *daily*, with great *Succeſs* and *Reputation.*

But to proſecute our intended Deſign: Since we find that Nature's Treaſury is never to be exhauſted, altho' new matter daily preſents its ſelf to our conſideration, whoever is converſant in Diſſection will find, it is an *Advantage* well worth his Care, and his Study; for, without it, many things would have been in doubt, and judg'd uncertain, if Light had not been borrow'd from hence, by evident Demonſtration, and by *Reaſon*, which *Experience* authorizeth.

And ſince it is as natural as modeſt, for every Man to give the *Palm* to him who beſt deſerves it, and that it is the Law of all Nations, to give Honour and Juſtice to thoſe, who by the Sweat of their Brows, and their unwearied Labours, have commanded our Veneration; ſo in this I ſhall no ways be wanting of paying a due obſervance to their Names, whoſe Induſtry and Diſquiſition requires our Applauſe. And ſince moſt *Nations* have had a Share of theſe Fortunate Diſcoveries, and ſome more famous for finding out the Uſes and Offices of the Parts in general, whilſt others have employ'd their Studies in making *excellent Obſervations* on the ſame; ſo in either, our own *Countrymen* have not come ſhort of any: And tho' they have it as a *Proverb* beyond Sea, that we *Engliſh.men* are better at *Tranſcription* than *Invention*, it being much eaſier to *tranſcribe* and *copy*, than to *invent* and *improve*; yet I can tell them, We have as good *Stars* in *England*, as they can pretend to elſewhere, and which have given as great Light into *Medicine* and *Anatomy*, as any other Country or Nation whatſoever.

And tho' in former Ages, for *Anatomy*, *Bauhine*, *Valverdus*, *Laurentius*, *Veſalius*, *Veſlingius*, *Placentinus*, *Spigelius*, *Riolan*, *Fallopius*, *Columbus*, *Remilinus*, *Bartholine*, *Wallæus*, *Cabrolus*, and the like, were all eſteem'd *Great Maſters* of the *Knife*, and Moſt Exquiſite *Anatomiſts*; ſo, ſince their time, the Study both of *Medicine* and *Anatomy* hath been much more cultivated, with much greater perfection, by the curious Endeavours and induſtrious Labours of *Borellus*, *Swammerdam*, *Steno*, *Bilſius*, *Regnerus de Graaf*, *Diemerbroeck*, *Du Verny*, and others. Where we may obſerve, that ſcarce few or none of them come abroad without mentioning our *Engliſh Worthies*.

Have not the Renowned *Harvey* gain'd an Immortal Fame all o'er the World, for his firſt finding out the *Circulation* of the *Blood*, and his noble Diſcoveries about the *Generation*, *ex ovo*? In what *Veneration* and *Eſteem* was Sir *Theodore Mayern*, in all *Schools* and *Univerſities* beyond the Seas? How great was the Name of Sir *George Ent* amongſt them? How acceptable was Dr. *Needham de Formato Fœtu*? Of what general Eſteem *Wharton de Glandulis*, and *Gliſſon de Hepate*? What Veneration has all *Willis*'s Works? And how highly valu'd is *Lower de Corde*, *Charlton's Oeconomia*, &c. and *Briggs*'s *Ophthalmographia*? All which are *Engliſh Originals*. What *Venerable* and *Renowned*, as well as *Learned Readers*, have we had, both in the *College*, and in our *Anatomical Theatre* at *Surgeons Hall*, even to the wonder of other *Nations*, and to the great *honour* and *ſatisfaction* of our own, who, while living, wore the *Cap* and the *Gown*, as the *Glories* of their Faculties, and now dead, have their Memories bloſſom in the Beds of Fame? among whom (in my time) were the ever to be celebrated Sir *Charles Scarborough*, Dr. *Needham*, Dr. *Tern*, and Dr. *Croun*; and now Dr. *Browne* and Dr. *Tyſon*, both which have much encreas'd the Honour of *Anatomy* by their *Learned Lectures* both on the *Muſcles* and the *Viſcera*, in that it's not only become a great ſatisfaction to thoſe who have the honour of hearing 'em read upon Dead Bodies, but a greater pleaſure to thoſe who underſtand 'em. Nor are our *Phyſicians* leſs admirable and eminent than Others, in their *Phyſical* Books, where *Willis*, and *Browne*, and *Sydenham*, and *Gliſſon*, with ſeveral others, are allow'd to out-do any that have writ on the ſame Subjects before them.

And tho' there have been made many Efforts, and happy Eſſays, about the *Nerves*, and their affording and communicating their *Juices* and *Animal Spirits* to every *Muſcle* of the Body; and tho' it is as evidently underſtood, that every *Muſcle* is ſupply'd with Arteries and

Veins, to *import* and *export* the Blood throughout all parts of the Body, and that notwithſtanding the great *Borellus*, and many other Ingenious as well as Studious *Artiſts*, in our time, have bid fair for freſh *Notions*, and natural *Conjectures* ; how the *Nerves* and *Arteries* do furniſh the *Muſcles* with *Spirits* and *Blood* ; and how the *Veins* and *Lymphaducts* do ſend back the Bloods *Superfluities* and *Lympha* from them ; and that the Branches of theſe *Veſſels* being ſo minutely diſtributed throughout each *Muſcle*, having their terminations ſo ſmall, and ſo thin, and ſo ſubject to rend, that it is a matter of no ſmall difficulty to trace them to their terminations and inſertions. And tho' many other things in *Anatomy* have been found out purely by the benefit of *Microſcopes*, ſcarce otherwiſe to be diſcover'd by the naked Eye, yet, at this day, I could never read or hear of any that have found out, much leſs traced theſe Veſſels to their inſertions, altho' oft-times attempted, and carefully proſecuted, by the help of any Microſcope whatſoever. Now, that both *Nerves*, *Veins*, and *Arteries* are moſt certainly diſtributed into each *Muſcle* of the Body, is a Truth beyond contradiction ; and if ſo, it may reaſonably be allow'd and ſuppos'd, that theſe their ſmall Capillaries are interwoven and intermix'd with each other before they do terminate ; and if this be granted, then what *Borellus* and others write hereof, it cannot be ſuppos'd an Abſurdity to allow, that they may terminate in *Glands* ; and that if the ends of theſe Veſſels be ſo ſmall, and ſo thin, as not to be ſhewn by the beſt of *Microſcopes*, the *Glands* alſo, which are made out of their Terminations, muſt neceſſarily likewiſe be very ſmall, and very fine, and by the ſame reaſon not to be traced or found out by the help of any *Microſcope*. Nor will it ſeem irrational for any one to allow that theſe Veſſels do thus terminate, ſince, as I ſaid before, the *Glands* are made out of their Terminations, between which is kept up a certain Communion with each other in theſe ſmall Bodies : And if a *Gland*, as is well obſerv'd, doth conſiſt of an infinite number of very minute Veſſels, and if the branches of *Veins*, *Nerves*, and *Arteries* be divided before they terminate into an infinite number of moſt inviſible Twiggs, (as is moſt certain they do) when from any one Twigg of each ſort is derived a vaſt number, and all theſe ſo derived, are mix'd and interwoven one with another, why may we not allow, at leaſt *metaphorically*, ſince in their diſtributions they do imitate the Compoſition of *Glands*, that they do terminate in ſmall *Glands*. And thus far has the matter been driven by *Bolton*, and others before him : I hope this may ſpur on others, in making a farther progreſs in the tracing them out towards their Inſertions and Terminations. I ſhall only touch upon ſome further Annotations relating to the *Nerves*, *Veins*, *Arteries*, and *Tendinous Fibres* mention'd in our following Diſcourſe.

I begin with the Covering of the Brain, which is no otherwiſe than a contexture and co-unition of many ſmall *Glands*, who have their Blood allowed them from the *Arteries*, and *Veins* ; by which they do diſcharge the ſame ; having alſo granted them Excretory Veſſels, whence iſſues this their Liquor, which is ſeparated from the Blood, where they are ſeen to gather and encreaſe in little Bundles o'erſpreading theſe *Membranes*, which as they are advanced in the Body of the Animal, they do divide themſelves into various Branches, and ſpread themſelves all over it, ſo that there is ſcarce one part thereof freed from them. The *Nerves* alſo are ſo cloſely intertext, and ſo dexterouſly intermixt in the Body, that *Anatomiſts* call theſe intertextures *Plexus*, or *Webbs*, they being plainly view'd dividing themſelves into various Ramifications, the uſe of which *Nerves* is, to diſpenſe and diſtribute a Liquor which does bedew all the *Fibres* of the *Body*, even to their terminations; which Liquor, without all queſtion, is form'd out of the moſt ſubtile and volatile parts of the Blood, and generally goes under the name of Animal Spirits, from its Subtilty.

And whereas we readily ſee that the greateſt part of the *Nerves* do end in carnous or fleſhy bodies, which are cover'd over with fine Membranes, which ſaid bodies we commonly call *Muſcles*, ſo muſt we grant, that theſe *Muſcles* have both *Arteries*, *Nerves*, and *Veins* allow'd them; but how theſe are rank'd in them, is worthy our remark and obſervation. They at firſt appearing to our view as ſo many collective Bodies, run as it were into one Chord or String, whilſt at other places they are found more looſe, and kept at a diſtance, eſpecially where they take in their *Arteries* and *Veins*, after which alſo they plainly appear to grow cloſer again, and in the end do form a *Tendinous* Chord. The firſt and ſecond of theſe we commonly call *Tendons*, or the Heads and Tails of Muſcles; whilſt thoſe parts which are more looſely made, and into which both the *Arteries* and *Veins* do diſperſe themſelves, are more properly call'd, the Bellies of the Muſcles.

I having thus touch'd upon the *Nerves*, *Arteries*, *Veins*, and the carnous parts, with a relation to the *Tendinous Fibres*, we ſhall next look into thoſe *Fibres* which are ſeen to run parallel in all theſe Bodies, where we may find, as they are implanted into them, they do frame an obliquangular Parallelogram in the Body of the Muſcle, whilſt the other Tendons, which are more cloſely put together, do naturally reſemble two Strings drawing this obliquangular Parallelogram to its oppoſite ſides. And whereas the *Tendons* of Muſcles are nothing more than the connexions and meetings of ſimple *Fibres*, which we commonly call *Tendinous Fibres*, ſo the Interſpaces made in the Belly of the Muſcles are all of them fill'd with *Arteries* and *Veins*; and hence ariſeth the difference of their colours, for that as the common colour of the *Tendons* of the Muſcles is uſually of a whitiſh brown; ſo their Bellies for the moſt part appear red, which redneſs of Fleſh in theſe parts is no otherwiſe occaſion'd, than is that of a Glaſs fill'd with red Wine, in that as the Glaſs is made red by the colour of the Wine put into it, ſo alſo does this Fleſh become reddiſh by the Blood that it conſtantly receives from the *Arteries* and *Veins* belonging to it; all which will plainly appear by injecting warm Water into the *Arteries* and *Veins*, whoſe Branches being plentifully diſperſt throughout theſe fleſhy parts, altho' they allow it that reddiſh colour it plainly ſeems to bear, yet by frequent injecting into the ſaid Veſſels, as I ſaid before, and repeating the ſame, you will evidently diſcover the redneſs to abate, and loſe its colour, and at length naturally expreſs the ſame colour with the other parts of the *Tendons*.

Nor are the Muſcles made of *Arteries*, *Veins*, and *Tendinous Fibres* only, but have *Nerves* alſo given them, which branching and paſſing into their outward Coats, are ſometimes ſeen to reach the *Tendinous Fibres*, and the *Tendons* themſelves; yea, many times they are found to be inſerted into the very Bodies of the Muſcles: And *Borellus* allows it as a general Obſervation, with many other Excellent *Anatomiſts*, that let 'em enter into any part whatſoever, they commonly are ſeen terminating with the *Tendinous Fibres* : And whereas it is farther allow'd on all hands, that theſe *Tendinous Fibres* have Cavities in 'em, like that of a Pipe (altho' this is not apparent to the Eye) yet Reaſon and Experience do both convince the ſame, in that when we allow a Muſcle to act, we apparently diſcover its *Fibres* become ſhortned, and its ſelf at the ſame moment becomes thicker. Nor indeed can we conceive how flexible *Fibres* can encreaſe and grow larger, and yet become ſhortned at the ſame minute; were it not that ſomewhat of Liquor muſt paſs into their Interſpaces, which, as it goes along or enters, may be allow'd in time to reach its terminations. And this is hence further made good, in that when each *Tendinous Fibre* receives a Branch of a *Nerve* into it, and this Branch communicates Animal Spirits into the Cavities of the ſaid *Tendinous Fibre*, and theſe Animal Spirits are the moſt ſubtile and agitated parts of the Blood ; whenever therefore theſe are ſuppos'd to enter the Cavities of the *Tendinous Fibres*, they fill them ſo as to ſhorten them ; even as Air which is blown into a Bladder is ſeen both to ſwell and ſhorten it at the ſame time. And then again, if we conſider that the Belly of the Muſcle is plentifully ſtor'd with *Arteries* and *Veins*, we cannot allow, that the *Tendinous Fibres* can be rais'd or ſwell'd without compreſſing or leſſening the Cavities of theſe *Arteries* and *Veins* : whence it conſequently follows, that the Blood muſt be propel'd and diſcharg'd out of them. And as a Concluſion to the whole, it's frequently obſervable, that when the Blood ſtagnates in the *Arteries* or *Veins*, the *Tendinous Fibres* have not Force or Vigour enough from the Animal Spirits to cauſe any farther propulſion of the Blood; and the want of which doing is the only occaſion of their not being any longer dilated or ſhortned : And hence we may therefore preſume to propoſe, that there are two things plainly requir'd towards the raiſing theſe *Tendinous Fibres* of the *Muſcles* ; firſt, that the Animal Spirits muſt have their free courſe through the *Nerve* entring the *Muſcle*; for *daily Experience* makes good, that where any *Nerve* is cut, or bound up very tite, the Muſcles which receive any Branches from it muſt certainly become flaccid ; nor can you make its *Fibres* ever ſwell by your beſt Tryals of Skill you can make. Next, that the Blood muſt have alſo its free courſe through the *Arteries* and *Veins* belonging to the Muſcles ; for ſince the *Tendinous Fibres* cannot be dilated without pinching or ſtreightning the *Arteries* and *Veins*, and theſe cannot be ſtreightned without voiding or diſcharging their Blood, it muſt hence follow, that if the Blood ſtagnate, or makes a ſtop here, it muſt prevent the raiſing of the *Tendinous Fibres*. Again ; the *Tendons* of the Muſcles are for the moſt part faſten'd to ſome Cartilage or Bone, and this is the Reaſon why the ſhortning of the *Tendinous Fibres* makes one part move to that, to which the ſaid *Tendons* are faſten'd: Thus, when one part of the *Tendon* is faſten'd to an immovable part, and the other is annex'd to a movable part, it muſt neceſſarily follow, that whenever the Muſcle is ſhortned, the movable part is brought to the immovable : And whereas there is ſcarce any motion in a part which has not allow'd it its oppoſite motion, ſo is there ſcarce a Muſcle in the Body, but what has its Antagoniſt ; and, as a general Rule amongſt *Anatomiſts*, it is obſerv'd among theſe Antagoniſtical Muſcles, that when one is ſhortned the other is extended;

tended, in that the ſhortning of the Muſcle which acts muſt neceſſarily produce an extenſion of its Antagoniſt, or of that which acteth not.

Having thus clear'd up the *Parts* of a *Muſcle*, and ſhewn you its true *Uſes* and *Operations*, what remains, we recommend to the Reader in the Body of the Book, where he will meet with the Advantage both of the *Names* and *Uſes* of every Muſcle properly deſcribed in one view, as much as can be expreſt by Figures; with an *Excellent*, and *Philoſophical*, and *Mathematical* account of **Muſcular Motion**, with the Uſe of the *Heart*, and Circulation of the *Blood*, *&c.* the Whole being adorned with various Eminent *Annotations*, and Curious *Obſervations*, for the benefit of every *Student*, and ſuch others, who may delight themſelves with theſe *Anatomical Studies.* If the Reader perchance may meet with any Slipps, either from my *Pen*, or the *Preſs*, throughout the Whole, he is deſired to make a favourable Conſtruction on them, or paſs them by, without any Malicious Contrivance, or Invidious Reflection.

From my Houſe, at the Golden
Key *near the* Mews, *at* Cha-
ring-croſs, *July* 12. 1698.

Vale.

To my very much Eſteemed Friend,

Mr. JOHN BROWNE,

Sworn CHYRURGION to His *MAJESTY*,

On his MYOGRAPHIA NOVA.

SIR,

ANATOMY, *wherein you have ſo excellently well adorned your Province, is not only of great Uſe in* Chyrurgery *and* Medicine, *but alſo in ſome parts of* Phyloſophy ; *and is moreover ſubſervient to Religion.*

Its ſhews its Phyloſophical Uſefulneſs, *when it demonſtrates by how admirable and divine* Mechany *the* Animal Fabrick *is raiſed*; *and when it explains the* Power, *and the wiſe* Conduct, *by which the whole* Oeconomy *is managed*: *Which indeed is ſo wonderful, that from thence the excellent Phyſitian and Naturaliſt*, Galen, *found himſelf obliged to riſe up into the moſt ſublime Praiſes and Admiration of the* CREATOR. *Hence his Books, which were written* de Uſu Partium, *are clearly a* Divine Hymn *or* Song, *by which he celebrates the immenſe Wiſdom, Providence and Goodneſs of the Almighty.*

So that the Knife *and* Lectures *of a skilful* Anatomiſt, *cannot but preach* Religion *even to the very* Atheiſt, *when he ſees the ſtupendious* Make *of* Living Creatures, *when he conſiders the* Subtilty, *the* Variety, *and wiſe Contrivance of* Parts *in the moſt minute, as well as in the largeſt Animals, by which all their inward and outward Actions and Motions, their Sounds, their Voices and Words were formed and exerted. All which, nothing leſs than an* Omnipotent Being *could Effect.*

For the Prattle *of the* Roman Effigies, *called* Citeria, *the* Utterance *of* Words *by the* Earthen Head *of* Albertus Magnus, *or by the* Brazen Head *of* Roger Bacon, *were, tho' ſubtile Artifice, but faint Reſemblances : And the* Articulate Speech, *together with the raiſing and reſolving of propoſed Queſtions by the* American Parrot, *was plainly Diabolical, and therefore not from Animal Senſe or Energy.*

The Flying *of the* Wooden Pigeon *of* Architas, *or of the* Wooden Eagle *of* Regiomontanus, *which took Wing (if I may ſo ſay) and mounted up into the air, and ſhewed the Emperor, who was then going to* Norimberg, *the way thither : The* Walking *of the* Statues *of* Dædalus, *and the* Steps *of the* Iron Image *in* Africa *(which advanced ſeveral Paces to make its Addreſs to the King of* Morocco, *and with bended Knees preſented a Petition to him in behalf of the* Artificer) *were all (as moſt other* Automata *are) ingenious Contrivance, but yet very imperfect Imitations of* Living Nature, *accompliſhed by* Weights *and* Screws, *and* Wheels, *or by* Quickſilver, *and the ſubtile* Vapours *of* Inanimate Spirits.

But the moſt exquiſite Art *cannot frame ſuch Inſtruments, and infuſe thoſe internal Powers into them which are neceſſary for Animal Actions : Nor is* Nature (*which is only Matter and Motion*) *able, without the Influence and Direction of a living* Spirit, *to excite their ſpontaneous Motions : Neither could ſuch a* Spirit *be originally made, but by the Hand of* God, *who in the beginning, made the* Seed *of all* Bruits *of an* Ætherial *and* Fiery Matter, *and the* Soul *of* Man *of a* Supracæleſtial Eſſence.

Now Anatomy *is able to ſhew us, that not only in the Seeds of Vegetables, but in the Seeds of Animals alſo, the individual Species is compendiouſly and actually couched; and by conſequence, that all Generation is ſtill the Work of the* CREATOR, *who made the firſt Seed.*

So that your Anatomical Adminiſtrations, *are more* Theological *than every one imagines, and do elegantly diſplay the* Wiſdom *and* Art *of the* Divne Potter, *who formed the beautiful* Statue *of* Man *out of* Clay.

And not only thoſe Muſcles *which enable the* Mouth *to ſpeak, and the* Hands *to write, but all of them (which were ſo wonderfully made by God, and are ſo neatly delineated by you) do empower and inſtruct us to ſpeak and ſing* Hallelujahs.

And they induce me to eſteem and praiſe this your Muſculary Tract, *wherein, by imprinting the* Name *upon, and adding the* Uſe *to each* Muſcle, *you render the Study of this part of* Anatomy *ſo eaſy and delightful, that not only Students in* Medicine *and* Chyrurgery, *but alſo* Ingenious Gentlemen, *who are curious, and deſire to underſtand how they* Move *and* Act, *will be incouraged to enquire into it, and to ſtudy it.*

They will be pleaſed with the Contemplations *which* Muſcular Motion *may raiſe and ſuggeſt unto them; and will admire the* Arguments *that ſome* Animals, *which we commonly call* Irrational, *do frame by the managment of their* Muſcles, *to prove their* Right Reaſoning.

So the Wolf-Fiſh, *when he perceives the Deſign of the* Fiſherman, *and the danger of his* Nett, *ſhoots to the bottom of the Water, and furrows the Sand with his* Tayl, *till he hath lodged himſelf in it below the reach of the* Nett.

So likewiſe the Pontian Fox, *who lives by his* Wit, *when he ſees a* Booty *near, claps and involves his Head between his* Legs, *and erects his* Tayl, *and bends it at the Top, ſo as to make the* Reſemblance *of a* Bird, *by which he emboldens the* Fowl *to approach him, as one of their* Kind, *and ſo makes them his* Prey.

So that they ſeem to confirm the Opinion, that the Supream Faculty *of the* Humane Soul; *and that which diſtinguiſheth* Man *and* Brute, *is a Mind (a Power above that of Rational) capable of* Supernatural, *and Heavenly* Contemplation, *&c.*

But there is a more ſurprizing Conſideration of the Muſcles, *that without the* Uſe *and* Motion *of that admirable* Engine, *the* Hand, *Mankind would quickly loſe that* Dominion *which* God *hath given him, over all other* Animals: *His* Strength *would not defend him from the* Sting *of* Punees, *nor his* Wiſdom *guard him from the Inſults of an* Ape, *or the Kicks of an* Aſs: *The wild Beaſts would hunt him, and make him their* Game, *ſo that he would in the next Generation, ceaſe to be, or become as it were a* Bruite.

In Sum, whether we reſpect the uſeful, or pleaſant Knowledge of Muſcular Motion, *'twill be highly Satisfactory to the Studious; therefore this your Ingenious and Curious Way of expoſing it, merits both publick* Air *and* Eulogy, *which is the juſt Sentiment of a Lover of your* Art *and* Induſtry.

Edmund Dickinſon, *M. D.*
Lately Phyſitian to the Perſons and Families of
King *Charles* II, and King *James* II.

To His Worthy Friend,

Mr. JOHN BROWNE,

Sworn Chyrurgeon to His *Majeſty*.

SIR,

I Have at laſt Anſwer'd your Deſires in this Impreſſion, tho' there was no need of it, after our learned Preſident and Cenſors, and thoſe other worthy Phyſicians had recommended it to the Publick.

I confeſs, the repreſenting the Names of the Muſcles *in the Humane Body, and* their Uſes in one View, *may be of great Advantage in your Profeſſion, and deſerves Incouragement: But as it leads to higher Conſiderations, I am oblig'd to commend your great Induſtry.*

The peculiar Frame and Uſes of the Muſcles in Man *(particularly* of the Hands) *are wonderful, as they are requiſite not only in the fine Operations of your Art, but alſo in* Agriculture, Navigation, Writing, Manufacture, Building, *and all ſorts of* Mechanic Arts, *(which the Brutes are not capable of) to which the exquiſite* Fabrick *of thoſe* * of the Legs *in ſome of theſe aſſiſt: But beſides, the Formation of the* Lumbricales *and* Perforantes *in the Hand (deſcrib'd* Tab. 22, and 24.) *was requiſite in the fine Stops of the Organ, and other muſical Inſtruments in the Service of the Great* Creator, *as the* Muſcles *of the* * Tongue *and* Larynx *are ſubſervient to thoſe Hymns and Praiſes we duly offer to him; whereas* the Beaſts *(who were not deſigned for that Harmony) have only* one particular Note *to* call to their Kind, *or be diſtinguiſht by. It was the Conſideration of this, that made* Galen *ſo ſenſible of the admirable Oeconomy of the Body in his Tract* de Uſu partium; *and* Mr. Hobbs *confeſſes the ſame* (Lib. de Homine Cap. 1.) *where repreſenting* Epicurus's *Opinion, about the* Autocthones *or* Terrigenæ, *he is aſhamed of it, (as I alſo knew by his Converſation); and, like a Convert of the* more learned Harvey *on that Subject, as to the Formation of the* Fœtus, *and its Nouriſhment afterwards by the Breaſts, ends the Chapter in theſe Words;* Qui machinas omnes, tum Generationis tum Nutritionis ſatis perſpexerint, nec tamen eas a Mente aliqua conditas ordinataſq; ad ſua quaſq; Officia viderint, ipſi profecto ſine mente eſſe cenſendi ſunt.

* In Tab. 36, 37.

* In Tab. 8, 9, 10.

The Make *indeed of the Parts of the Humane Body, at firſt view, is very ſurprizing; and the rude Diſſections in the time of* Galen, *the Inſpections of the* Viſcera, *and the* Sacrifices *of the dark Ages (which obtain'd univerſally) gave many Glimpſes of the* Great Author; *but the Improvement of Anatomy in our times, and the Helps we have* *by Microſcopes of viewing more thoroughly the curious Formation of the Parts, ſets us in a much better Light, and raiſes our Admiration higher. The Conſideration hereof may afford excellent and convincing Arguments againſt* the growing Atheiſm *of our Age, and may prevail more than thoſe of a Metaphyſical Nature on the* Sceptics *or Half-witted Philoſophers amongſt us; and I doubt not, but by a* Mecænas *that may incourage here a* Set of ingenious Anatomiſts, *the learned* Mr. Boyle's *noble Deſign in his Lectures might be compleated. I confeſs, I have ſometimes thought of Publiſhing a* Tract, *againſt the* Epicurean Sect, *that has lain by me for ſome years, about the* Origine of Man, (*before I ſhall* thoſe *I have promiſed about the* Uſes and Diſtempers *of the parts of the Eye) and I queſtion not but* the Argument, *with the fore-mentioned Aſſiſtance, might be ſo managed as to make* Atheiſm *as ridiculous as thoſe excellent Prelates and others of our times have done* Superſtition *and* Idolatry. *I could wiſh in Order hereunto, that* Anatomical Studies *were incouraged and brought to the greateſt Perfection, and the Deſcription and Uſes of all the parts accurately ſet forth; and as you have taken a great deal of Pains in this Treatiſe, ſo I could wiſh (wherein I hope you will excuſe the Liberty of Friendſhip) that there might be a further Progreſs in the Graphical Deſcription of the* Muſcles, *and that their admirable* Series Fibrarum *(as they ſerve to ſo many ſeveral Motions of the Body) were delineated in the Mathematical Method of the learned* Steno, *if any* Taille-Douce *can reach it.*

But you have Apology enough of your ſide, on the Account of the great Charge and number of Patrons required toward it; and therefore I ſhall only add (with thanks for your preſent ingenious Performance) that I am,

SIR,

Your faithful Friend and Servant,

William Briggs, M. D.

Fellow of the College of Phyſitians in *London*,
and Phyſician in Ordinary to His *Majeſty*.

To the much Valued and Worthily Eſteem'd,

Mr. John Browne,

Sworn *Chirurgeon* to His MAJESTY.

SIR,

I *Have, as my time would permit, peruſed your Book of* Muſcles, *and obſerved your Method in the Deſcription of them; which ſeems to agree with the beſt of Authors I have met with, and I do think it the moſt uſeful Book of the Kind I have ſeen; not only for a ſhorter way of informing Young Students in* Phyſick *and* Surgery, *but for refreſhing the Memories of others more verſt in ſuch Exerciſes: And as you have ſhewed great Labour, Ingenuity and Induſtry by your very Pertinent and Appoſite Additions, (to what you have done before) ſo I hope it may prevent many Injuries which might happen to Mankind: For I have obſerved thoſe of your Profeſſion, (or rather Pretenders to it) who were moſt deficient in* Anatomical Knowledge, *were moſt bold with their* Knives *and* Lancets *(which I have too often ſeen).*

Therefore I do not think I do ill to mention it here, becauſe it ſeems to me to be abſolutely neceſſary, that whoſoever ſhall attempt to make uſe of his inciſion Knife *or* Lancet *upon any part of a living* (Humane) *Body, ought to know what lies under the Skin or Place within the reach of the Point of either of them, or the Diſtance he intends they ſhall Act in; for in the common Uſe of letting Blood, the want of Knowledge in the Origination of ſome* Muſcles, *and Inſertion of others, their* Tendons *are often prickt, not only to the loſs of Limbs, but Life its ſelf: (I do not mention wounding of* Arteries, &c. *which are equally dangerous.*

The Conſideration of which, one would think ſhould be a ſufficient Caution to all, who have Occaſion for Chirurgical Operations, *to chooſe ſuch Perſons as experimentally and diſtinctly know the Nature and Difference of the parts,* &c. *and how they do lye, that they may be ſure to avoid doing a Miſchief to the Perſon they intended to do good to; at leaſt this is my Opinion, who am a Lover of* Anatomy, *and of all thoſe that are Improvers of it, and think my ſelf obliged to Thank You, for the great Pains you have taken therein. And,*

I am SIR,
Your Grateful Friend, and Affectionate Servant,
Edmund King, M. D.

Phyſician in Ordinary to the Late King *CHARLES* II,
Fellow of the College of Phyſicians of *London*, and
of the *Royal Society*.

TO
Mr. JOHN BROWNE,
Sworn CHIRURGEON to His *Majeſty*.
On His Myographia Nova.

SIR,

ON *the coming abroad of your laſt Edition of the* Muſcles, *I endeavour'd to ſhew how* Surpriſing, Incredible, *and how* Indefinite *the Powers of theſe* Machines *are, That even our dayly and moſt unheeded Actions were no leſs aſtoniſhing, than they are the real Effects of theſe very tender and delicate* Bodies; *and that none could doubt, but that an exact numbering of thoſe* Mechanical Powers *is a great Step towards a farther diſcovery of their Energy and Operations. 'Tis true, ſuch Occaſions of Admiration have not altogether eſcap'd the Notices and Obſervations both of* Ignorant, *and more* Diſcerning *People; the Phyloſophers and Phyſicians have admir'd, and the reſt of Mankind have been deſervedly aſtoniſhed at ſuch incomprehenſible, tho' moſt obvious* Phænomena; *the laſt have remained quiet, and reſolved* All *moſt devoutly into the infinite Power of the* Omnipotent Creator; *while the firſt amuſe themſelves and the World with a fanciful* Story *of theſe aſtoniſhing Appearances, being performed by their* Contraction, *that becauſe when we inquire into the Action of a* Muſcle, *we obſerve that it Swells, is Shortned, and That which is tyed to it, is brought from its Place, and follows the Motion of the Contracted* Muſcle, *which is eaſily ſeen by all the World, whether Phyloſophers, Phyſicians, or People of a lower Form and Degree in Underſtanding; but ſo ſoon as we come to enquire, how a Contracted* Muſcle *is in that* State, *and ſo as to draw ſome hundred weights along with it, how the Power that propels the Blood drives round a Body in bulk, and Reſiſtences in Motion, equal to ſome three hundred weight; then we find our men of Learning as much at a ſtand, as the moſt ordinary of the Gazing and Admiring* Mob; *nothing is talk'd of, but ill made* Similes, *unaccountable* Exploſions, Gun-powder Plots, *ſtrange* Conflicts *of unknown* Salts, *and a thouſand more ſuch Rude Things, as ſome Gentlemen would put upon us; but the great Fault of all is, that the* Laws *of this* Mechaniſm *are too generally brought us from very daring People, that never thought of mechanical Powers, and are not able to determine the Motion of any two Bodies, in the moſt eaſy Circumſtances at any other time. But all this is of laſt Year, and therefore let me, in ſhort, commend the Hiſtory of Muſcles you have now given us; concerning which, I muſt ſay you are more modeſt, than ſome People that have more exalted Thoughts of their own Underſtanding, that you know your own Strength better than they in an Attempt, where almoſt all the*

the learned have ſuffered Shipwrack, and that inſtead of bullying the World into a Belief of your ſingular Knowledge in this Matter, you oblige it with the learned Bernulius *his Eſſay of* Muſcular Motion, *becauſe you are very conſcious, that whatſoever has been ſaid on that Subject by any One but himſelf, and the moſt famous* Prodigie *of Calculations of this Kind* Alph. Borell. *ought to be forgot among Phyloſopers and Phyſicians, as the moſt charitable Offices can be done to the* Names *of ſuch* Authors; *and that indeed, ſo great and hard an Undertaking is only to be finiſhed by men of the like Qualifications and Learning, that theſe Great Men ſet firſt out with: I will not have the ill Nature to bring upon the Stage, ſome Experiments that have been very lately, but very ill made, on a deſign to clear up this Matter; 'tis ſufficient that they are known, and therefore to come nearer to the following Book, I do believe it is very* Ingenuous, Honeſt, *and* well *meant; you continue the Plates of the Muſcles of the former Book, only you make them carry their Names on each of their Fore-heads, that, ſince Health and Sickneſs generally proceed from them, you may the more eaſily perform your Deſign you have to ſhew, from Your and other men of Practice Obſervations how they have been hurt, and what Means have been uſed to reſtore them to their former healthy Condition, which, to ſay no greater things of this Undertaking, will be of uſe enough to young Beginners, whatever advantage older People of Modeſty may reap thereby. You eſtabliſh the* Muſcles *that have different Offices for the various Performances in our Bodies, and wiſely conclude, that ſuch a Muſcle is hurt, when ſuch an Action is empair'd or entirely deſtroy'd: In* Tumours *you ſhew, that when they are of an extream Hardneſs, and the Liquors are more powerfully penn'd up, how they have been reſolv'd, and how the ſtagnating Juices have recovered their Motion; how* ulcerous Matter *that is thin to a degree, and did corrode the* Fibres *and more ſolid parts, has been chang'd, brought to a better Conſiſtence, and is made more nouriſhing; how* Hurts *receiv'd in one part, produce Effects, that Alarum us more, and in places very remote from where the Accident at firſt happened; how* Muſcles *ſeem totally to be deſtroyed, and yet to grow up again, as I my ſelf have ſeen the* Glutæi *almoſt perfectly extirpated by a Cannon-Shot, and yet to recover in a very little time, conſidering the Hurt. 'Tis true, this is all done without either aſſigning the Cauſes of* Muſcular Motion, *evincing the particular bigneſſes of parts of ſtagnating Matter in ſmall and Capillary Branches of* Arteries, *and the* Weakneſs *of the Propelling Power: You do not diſcover the Degrees of* Meagreneſs *of the Blood's* Lympha, *or its decay of* Spirits *that maintain this Thinneſs of* Matter *and* Undigeſtion; *and yet your Work is very uſeful in telling us how far the Inſtances you do recite, have ſucceeded, and by this means may eſtabliſh or reform former Practices, tho' not ſo certainly as when Hints are given th' other Way: A further Proof of this may be an Inſtance of a* Gonorrhæa *I gave you, which evidently proves, that this Iſſue of Matter, howſoever conſiderable it has been ſeen, does only proceed from the* Yard, *tho' this very Reaſon is brought by Authors for the* Impoſſibility *of its coming thence: The Experiment eſtabliſhes the* Fact, *and if on the other way* *of reaſoning we were to demonſtrate, it might be made very plain, that the place they have ſettled for it, is more Remote and out of Sight, but is a great deal more incapable to give any ſuch Supply then the* Penis *its ſelf; and I hope I ſhall ſometimes ſhew you, that twice the Quantity, that ever has been obſerved to come that way, may flow from this very barren Fountain. After all, your Way is that kind of* Knowledge, *we call* Experimental, *which is very convincing, and certain too, if the Experiences have the requiſite Conditions: It is ſurely more hard to prove à* priori, *(as Phyloſophers call it) than by the* Weather-Glaſs *or* Guerick, *or* Mr. Boyle's Air-pumps, *that the* Air *is a* heavy Body, *that It makes a firm and ſtrong* Reſiſtence, *like a Wall, that it cannot be penetrated by other Bodies, but that even this imperceptible Nothing it ſelf is confin'd, and upon Trials, is able to break other very ſtrong Bodies for its Paſſage: Juſt ſo it ſhould prove a very hard Task, to perſwade the moſt of people of the wonderful and ſtupendous ſmalneſs of ſome Bodies, that tho' they are of ſuch a ſmalneſs, that they do not come under Trials of our bare Senſes, yet there are ſtill Bodies ſmaller than Them: I ſay few could apprehend ſuch* Paradoxes *by all the Demonſtrations about* Diviſibility *of Matter* in Infinitum; *but the Proof will ſtill be eaſier, by obſerving how the* Beams *of our Luminous Sun do inſinuate themſelves into the common Glaſs of our Windows, and yet with that Force and Quickneſs of Motion, that we are not able to look upon the Author & Original of ſo great ſplendour Himſelf, thorow the ſame Avenues that he delights us, and clears up our dusky Cells; I ſay, we find no difficulty to grant, that the Glaſs has* Paſſages *or* Pores *by which the Sun's Rays make their Entry; next, that the Bodies that paſs theſe Pores are very ſubtile, and of a very fine* Make, *becauſe theſe very Pores that are the Paſſages, are not to be diſcern'd by us, even when we have the Aſſiſtance of the beſt Microſcopes; And laſtly, we ſtill diſcover, that the parts of theſe Rays are ſmaller than the Particles that make up the Air, which cannot be forced thorow theſe Pores, by the greateſt Motion we can give them. And ſince theſe are the plain and ſettled Advantages of Experimental Knowledge, that it can diſcover Truths without any Trouble, to leſs diſcerning Underſtandings, I muſt believe, that the ſame Argument will hold for Your* practical Surgery *of* Muſcles, *which I am convinc'd will inſtruct Many, and give Hints to Some to demonſtrate ſuch Truths, by a more noble* Series *of Propoſitions. For my one ſhare, I think it my Duty to declare my Thoughts when Requir'd, which I now do with more Freedom and Liberty than People may think neceſſary; howſoever it is, I diſcharge my ſelf, and do wiſh as ſincerely, that they may be of publick Uſe, as that I am,*

Your moſt Humble Servant,

William Cockburn, M. D.

A Member of the College of Phyſicians,
and a *F. R. S.*

To His Eſteemed Friend

Mr. John Browne,

Sworn Chirurgeon to His MAJESTY:

ON HIS

Myographia Nova.

YOUR Undertaking's ſo ſublime to me,
I cannot fathom its Divinity ;
How God *made* Man, *to us you have made known,*
Each inward Motion by your Lines are ſhewn ;
You teach us how to know our ſelves, that we
May tread the Paths *of true* Philoſophy :
When Man *he made, He, with his* Godlike Art,
Fill'd with Amazement each contrived part,
So finely put together, rarely made,
Fill'd full with Uſe, for Art, *as well as* Trade ;
Where the more noble Brain *is plac'd above,*
With Opticks *to foreſee th' effects of's Love :*
How Reaſon ballances, and do's diſpenſe,
What ere we gain of Motion *or of* Senſe :
Whilſt Nature's Magazine, (*the noble* Heart)
Sends forth its Crimſon Liquor *thro' each part,*
And each Arterial Tube *propels the Blood,*
Into the purple Veins, *which it makes good*
Like Lines *to* Centres, *and do juſtly pay*
Back what they had, tho' by another way:
As Tydes *of Waters, rowling from the* Main,
Whoſe force being pincht, make their Reflux again;
So he that Nature's *Courſe obſerves and knows,*
Will ſoon allow the Blood in Circles *flows :*
Thus we perceive each Artery, Vein *and* Nerve,
Each ſingle Muſcle *does with Liquors ſerve,*
How each by Import, *and by* Export *too,*
Conveigh their Juices in us to and fro;
How Life preſerves its ſelf, how our parts move,
How all our Actions own a Pow'r *above;*
How each concenters to keep up our Pile,
And fills with Strength, by freſh repeated Chyle,
Each wearyed Limb, and with freſh Spirits give
Sufficient to ſupport, and make us live :
Thanks firſt to Providence, *who does diſpence,*
A Guard unto our Reaſon, *and our* Senſe;
And when we move, or act, or Wills incline,
To Subjects uſeful, *or to* Pow'rs Divine,
Let each his Goodneſs *in the main adore,*
That firſt gave Life *and* Being *to each* Pore;
And while our Muſcles *move, let's ſing his Praiſe,*
Whoſe Force *and* Energy *He hourly raiſe :*
And for your Pains in raiſing of the ſame,
And telling us their Uſe, and whence they came,
Their true Inſertions, and their Uſes rare,
With which no Author *yet did e're compare;*
Thanks to your Skill, *your* Pains, *and learned* Art,
All which are ſhewn in this laborious Part:
Let Criticks *belch, and* Mom's *contemn your Pains,*
Wiſe men *will ſpeak your Worth in lofty ſtrains,*
Whilſt Fools *deſpiſe your Book for want of brains;*
A juſt Encomium, *from your friend, would be*
Eſteem'd by ſuch, a down right Flattery:
My Pen's not worthy to proclaim your Fame,
Your Works themſelves will eternize your Name.

Sic ait George More.

To His Learned and moſt Ingenious Friend

Mr. JOHN BROWNE,

Sworn Chirurgeon to His *Majeſty*:

On His Excellent

Myographia Nova.

W*HO loves true* Worth, *can never*
(grudge to pay
An humble Tribute *to your rich*
(Eſſay;
That Nature *does unfold in every part*;
The Head, *the* Hand, *the* Liver, Lungs & Heart,
The Gall *and* Spleen, *the* Secrets; *how they give*
Strength *to each other*; *how from each receive.*
Man's made Monarchical! *His* Brain, Tongue,
Do frankly yield unto the Heart *Supplies*; (Eyes,
Not like to Coſtive Subjects *that repine*
At parting with a little Paultry Coin
To th' Royal Aid, *but as wiſe* Anglers (*hight*)
By yielding Baits, *bring th' uſeful* Fiſh *to bite*:
So, theſe Pay Taxes, *and ſecure thereby*,
Their Tranquil Peace, *and vital* Property.
Till now, Anatomiſts *were in the dark*,
And e'en by Gueſs *perform'd their dang'rous work*;
But here the Way's ſo clear'd, that e'ery Man,
As hath but Sence, *may th' greateſt* Errors *ſhun*;
For you each Muscle *have explain'd to view*,
Their Forms, *their* Names, *and various* Uſes *too*:
The Little World *can't* think, *or* ſpeak, *or* act,
But as your curious Method *doth direct.*
Veſalius, Riolan, Veſlingius, *and*
Laurentius, Bartholin, (*who could command*
The Knife *as well as any.*) *might hence* Learn
Chirurgick Truth, *from* Error *to diſcern.*
To this learn'd Labour, Harvey's *ſelf would bow*,
And Crook, *his own large* Volume *diſallow*,
Were they alive to ſee it. ——

The Regal Pſalmodiſt *might well exclaim*,
In Honour to the great Jehovah's *Name*,
That (*fragil*) Man *is wonderfully made*;
(*'Tis fit he ſhould, who is th' Almighty's* Shade;)
Had He *but ſeen this* Work, *'t might rais'd in*
A Sacred Rapture *of a higher* Strain; (Him,
Enforc'd him in that Holy Extaſie,
T'embrace thy Work, *breath* Bleſſings *upon* thee.
I Wonder *ſtill the more, the more I* Lock
(*My Worthy Friend*) *on your* Seraphick *Book*;
A Treaſure vaſt, *and every Way ſo* Good,
So High, *yet* Plain, *and eas'ly underſtood*;
That Elephants *may ſwim, and* Lambs *may wade*
In its ſafe Ocean, *and ne're be diſmay'd.*
Who ſays the Stars want Influence? Since we know,
At your bleſs'd Birth (*your future* Fame *to ſhew*)
There did aſcend bright Cor Leonis, *and*
As Patrons of your happ Brain *and* Hand,
The Pregnant Stilbon, *and ſoft* Venus *Joyn*,
Your Horoſcope *t' ennoble by a* Trine.
My Muſe *is much too* Barren *to commend*,
Your Peerleſs Pains, (*tho' I it well intend*);
Nor, need you a Dull Minor Shepherds Lays,
Since mighty PAN *adorns you with his Bays*,
And ſev'ral Senior *Gods your Merits praiſe.*
The Muſes Seats, Great Britains *radient* Eyes,
Unto your Skill *offer juſt* Sacrifice;
To Honour *you, what's wanting Leſs in Love*,
A Choire *of* Angels Court *You from above*,
To bear You *to* Elizium, *where you may*
Meet mightier Friends, *than in this* mortal Clay.

John Gadbury,
Student in Phyſick and Aſtrology.

TO
Mr. JOHN BROWNE,
CHIRURGEON to His *MAJESTY*,
On His Myographia Nova.

SIR,

I Am ſo fully convinc'd, That We are come far ſhort of the true and full Knowledge of the *Muſcles*, that I have always put *inter deſiderata Rei Anatomicæ*, an *exact Myology*. I would call that *Exact*, which beſides, the explaining the Names of the *Muſcles*, and their different Inſertions, ſhould moſt accurately lay open the Structure of the *Muſcles*, either *Simple* or *Compound*; and by expoſing to View the ſeveral *Plana Fibrarum*, ſhould ſhew the Order and Diſpoſition of each *Muſcle*, for this or that Motion. I muſt confeſs this Matter to be of great Extent, and to handle it as it ought to be, I am ſenſible one muſt have a great Knowledge in *Geometry* and *Mechanicks*: I am ſatisfied alſo, That the Hiſtory of the *Muſcles*, ought not to be given ſeparately, (as it has been hitherto) but that it would be much more convenient, to joyn to it the Deſcription of the *Bones*, *Cartilages* and *Ligaments*, without which, 'tis impoſſible to have a compleat Science of the Motions of *Animals*. I wiſh with all my Heart, that You, and ſome other *Ingenious Perſons*, would joyn their Endeavours, to undertake ſuch a Work, which would certainly acquire to the *Authors* thereof, an immortal Reputation: This is what there ſhould be Application made to, and not to loſe time in tranſlating into Engliſh, a *Groſs Volume of Anatomy*, whereof I confeſs I never could underſtand, either the *Beauty* or *Uſefulneſs*.

In the mean while, I am glad to learn, that you are about Reprinting your *Myology*, or *Treatiſe* of the *Muſcles*. What you have added to the former *Edition*, by cauſing the *Names of the Muſcles* to be engraven on the Plates, may ſerve to ſhorten the Study of thoſe who are deſirous to learn *Anatomy*; but eſpecially, by adding thereto, *their Action and their Uſes*, I doubt not, but you will ſtill make this laſt *Edition* more uſeful, and more acceptable to the *Publick*.

I am, SIR,

Your moſt affectionate Friend,
and humble Servant,

Peter Silveſtre, M. D.
And of the College of Phyſicians, *London*.

To the Ingenious
Mr. John Browne,
ON HIS
Graphical Deſcription
OF THE
Muſcles in Humane Body.

Darling of Nature, t' whom ſhe does impart,
The utmoſt Limits of Chirurgic Art;
Still had We gazed on the rare Machine,
Wonder'd! but ne're its Cauſe *of* Motion *ſeen;*
If thou had'ſt not the Mighty Work begun,
Which thou at length haſt as exactly done:
Thou haſt at once laid open to our View,
Each Muſcles *Uſe, Name, Situation too;*
The Whole ſo curiouſly is perform'd,
Thou ſeem'ſt t' have Heav'n *it ſelf for Knowledge ſtorm'd,*
And gain'd from thence ſo competent a Share,
None but a ſecond Solomon *that Dare,*
Skill in Anatomy *with Thee Compare;*
But for the Time to come, thy Works *will be,*
The only Touch-Stone *of true* Surgery.

Raptim Poſuit,
Amicus,
Amico,
Amicè,

Nathanael Tull.

To His much Eſteemed Friend,

Mr. JOHN BROWNE,
Sworn Chyrurgeon in Ordinary
TO THE
King's Moſt Excellent Majeſty,
Upon this laſt, and Compleat Edition of His Book.

'TWas Wiſely ſpoken by a Learned Tongue,
Mans Life is ſhort, but liberal *Art is long*.
Who to the Top of Knowledge would aſcend,
Muſt to a *ſingle* Science chiefly bend
His ſtudious thoughts: In vain we ſpend our hours
In queſt of *All*, when *One* our Time devours.
The Skilful Author of this curious Book,
His Meaſures from that famous Maxim took:
Does with freſh Vigour his Deſign purſue,
And once again his rare Attempts renew;
Has now, at length, to juſt Perfection brought
The unfiniſh'd Product of his Early Thought.
So *Nature* in her pregnant Womb proceeds,
Her beſt and Nobleſt Ofspring ſlowly breeds;
And *Art*, which is not Taught in *Natures* School,
Blunders, miſcarrys, and miſtakes its Rule.
One, who has fix'd his Name amongſt the Wiſe,
In a few Words much Learning doth comprize:
Know well *thy Self*, Examine whence thou Art,
And what diffuſes Life thro' every Part:
Next of thy Body view the wondrous Frame,
How Moiſt and Cold allay the vital Flame;
How branching *Nerves* to every Part convey
The Spirits, which the Will's Commands obey.
Then on the *Muſcles* fix thy wondring Eye,
And on thy Self this Learn'd Deſcription try:

Exert their Force, their various Motions prove,
And thou wilt find, as He deſcribes, they move.
Learn how the Blood its Circ'ling Courſe maintains,
And never ſtagnates in their ſpreading Veins.
As from the *Ocean*, Springs derive their Birth,
Thro' hollow Caverns, in the ſpungy Earth,
And then in rapid Streams return again,
In long *Meanders*, to the briny Main:
So, from the *Heart*, each Vein is fill'd with Blood,
Then to its Centre, rouls its *purple Flood.*
Men vainly hope in Knowledge to Advance,
Who attribute the Works of *God* to *Chance.*
Each *Part* ſo aptly to its *Uſe* Deſign'd,
Argues the Wiſdom of the *Eternal Mind.*
Dull, ſtupid Atheiſt! Curſt with want of Senſe,
Which thy beloved Atoms can't diſpence;
They are the perfect Image of thy Mind;
Both Senſeleſs, Rambling, incoherent, Blind.
If any Light can thro' thy Darkneſs Shine;
Here view thy Self, and own the Power Divine.

Thomas Walker, B. D.
Fellow of *Sidney-college, Cambridge.*

To His much Eſteemed Friend,

Mr. JOHN BROWNE,

Sworn Chyrurgeon to his *Majeſty*,

ON HIS

MYOGRAPHIA NOVA.

HAppy the Man, whom Meditation's Rays
Can warm, to ſound the Grand *Creator*'s Praiſe,
Like *Memnon*'s Statue, from the teeming Morn,
Strange Life and ſweet harmonious Strains are born.
Nature's ſo vaſt, and ſo delightful Field,
A fruitful Crop, a mighty Theme doth yield;
All which by no one Soul can be confin'd,
Except that *Soul of Souls*, th' *Eternal Mind*:
Yet humble ſtudious *Reaſon* may adore,
Ev'n here the ſacred Footſteps, and explore
The hidden *Author*, by th' apparent Force
Of Wiſdom, beaming thro' whole *Natures* Courſe.
Some from the *Earth* may find a Thought to ſpring,
Shall raiſe the Soul on Contemplation's Wing;
Some from the *Sun* and *Moon*, and *Stars* may claim
A Spark, that ſhall their wondring Minds enflame;
Some from the lofty Hill, and humble Dale,
Shall learn to Bow their Hearts, and Heaven to ſcale;
The *Waves* for their Inſtruction ſweetly flow,
Conſpiring *Winds* to their Conviction blow:
The *Seaſons*, Arguments to them afford,
And *Day* and *Night* declare their Mighty Lord;
Ten thouſand thouſand *Tongues* the *World* doth move,
To praiſe the Glorious *Architect* above.
Nor is the *Microcoſmos* ſilent here,
But, like her Great *Example*, every where
Beſpeaks the Gracious Hand, the boundleſs Art
Of him, whoſe Image is her better part.
Who can deſcribe, or who, but *BROWNE*, Explain
The Myſtick Chambers of the Noble *Brain*?
The glorious Fabrick of the *Eye* pourtray,
That Judge of Nature, Harbinger of Day?
The Talking, Taſting, wondrous, warbling *Tongue*,
Tun'd to her Maker's Praiſe in raptures Song?

Richly enſhrin'd, like *Eaſtern* Potentates,
In Crimſon Cabin, fenc'd with *Ivory* Gates?
The curious *Ear*, that Port of Diſcipline,
Her Anvil, Hammer, Drum, and Maze Divine?
But above all, the Sately, Princely *Heart*,
That Spring of Life, and Magazine of Art?
To whom all Veins their Crimſon *Tribute* pay,
From whom the ſame ſtill flows another way.
But who the *Muſcles* wondrous Force can tell,
That *Dance*, and *Fence*, and *Run*, and *Leap* ſo well?
That *Ride*, and *Swim*, and *Write*, and *Take*, and *Give*,
And *See*, *Taſte*, *Hear*, and *Feel*, and *Smell*, and *Live*?
That *Speak*, and *Kneel*, and *Lift* the pious Hand,
And *Actuate*, and *Cheriſh*, and *Command*:
All Parts and Organs, tho' ſo rich, ſo rare,
Lye uſeleſs, if the *Muſcles* work not there:
Theſe are the Miniſters, that ſtill diſpence
The Bodies Will, the Myſteries of Senſe:
They *Raiſe*, they *Shut*, they *Open*, they *Uphold*,
They *Yield*, *Reſiſt*, *Envelop*, and *Unfold*:
All that is *Done*, or *Born*, they *Do*, or *Bear*;
But, how they're clad, how work, why, what and where,
This *BROWNE* alone moſt evidently ſhews,
In laſting Braſs and everlaſting Proſe.

Joſhua Barnes, B. D.
Profeſſor of the Greek Language, and Senior
Fellow of *Emmanuel-College* in *Cambridge*.

This TABLE ſheweth the Names of the *Muſcles* as they do ariſe in *Diſſection*, and as they are contained in the *Lectures*.

Obliquus Deſcendens,
Obliquus Aſcendens.
Rectus,
Pyramidalis,
Tranſverſus,
Cremaſteres,
Dartos,
Muſculi Clitoridis,
Directores,
Acceleratores Urinæ,
Frontalis,
Corrugator,
Occipitalis,
Orbicularis Clauſor,
Elevator Palpabræ,
Clauſor Oculi Superior,
Clauſor Oculi Inferior,
Recti Quatuor Oculi,
Obliquus primus Oculi,
Obliquus ſecundus Oculi,
Elevator Auris,
Detractor Auris, or *Triceps,*
Adductor Auris,
Abductor Auris,
Externus Tympani Auris,
Internus Tympani Auris,
Abductor Naſi alas,
Elevator Naſi alas,
Clauſor Naſi Externus,
Clauſor Naſi Internus,
Naſi Clauſor Communis,
Zygomaticus Riolani,
Abductor Labii,
Depreſſor Labii Inferioris,
Conſtrictor Labiorum,
Platyſma Myodes, or *Quadratus,*
Buccinator,
Maſſeter, or *Manſorius,*
Temporalis, or *Crotaphites,*
Maſtoideus,
Biventer, or *Digaſtricus,*
Coracohyoideus,
Sternohyoideus,
Sternothyroideus,
Hyothyroideus,
Styloceratohyoideus,
Pterygopalatinus,
Sphænopalatinus,
Mylohyoideus,
Geneiohyoideus,
Mylogloſſus,
Ceratogloſſus,
Geneiogloſſus,
Hypſiogloſſus, or *Baſiogloſſus,*
Stylogloſſus,
Lingualis,
Crycothyroidæus Anticus,
Oeſophagæus, or *Sphincter Gulæ,*
Stylopharyngæus,
Cephalopharyngæus,
Sphænopharyngæus,
Crycoarytænoides Poſticus,
Crycoarytænoides Lateralis,
Arytænoides,
Thyroarytænoides,
Pterygoideus externus,
Pterygoideus Internus,
Longus,
Scalenus, or *Triangularis,*
Pectoralis,
Subclavius,
Serratus Major Anticus,

Serratus Minor Anticus,
Intercoſtales Externi,
Intercoſtales Interni,
Levatores Ani,
Sphincter Ani,
Sphincter Veſicæ,
Detruſor Urinæ,
Diaphragma,
Cor, cum Vaſis ſuis, &c.

Here let the Body be turned upon the Face.

Cucullaris, or *Trapezius,*
Latiſſimus Dorſi,
Rhomboides,
Levator Patientiæ,
Rotundus Major,
Superſcapularis Superior,
Superſcapularis Inferior,
Nonus Humeri Placentini, or *Rotundus,*
Subſcapularis.

If you intend to take off the whole Arm with the *Scapula,* the Diſſection of theſe following *Muſcles* will with more Eaſe be performed.

Deltoides,
Biceps,
Octavus Humeri, or *Teres Minor,*
Brachiæus Internus,
Gemellus Major,
Gemellus Minor,
Anconæus,
Palmaris,
Caro Muſculoſa Quadrata,
Flexor Carpi Interior, or *Ulnaris,*
Flexor Carpi Exterior, or *Radialis,*
Flexor ſecundi Internodii, or *Perforatus,*
Flexor tertii Internodii, or *Perforans,*
Flexor tertii Internodii Pollicis,
Pronator Radii Teres,
Pronator Quadratus,
Flexores primi Internodii digitorum,
Flexores primi Internodii Pollicis,
Flexor ejuſdem ſecundus,
Flexor ſecundi Internodii Pollicis,
Flexor { *Primus,*
Secundus,
Tertius,
Quartus,
Minimi digiti abductor,
Pollicis Abductor,
Pollicis Adductor,
Interoſſei Manus,
Extenſor Carpi Exterior, or *Bicornis,*
Extenſor Carpi Interior, or *Ulnaris,*
Extenſor ſecundi & tertii Internodii digitorum,
Supinator Radii Longus,
Primi Internodii Extenſores,
Extenſor Oſſis tertii Pollicis,
Abductor Indicis,
Supinator Radii brevis.

Here you return to the Body its ſelf as it lies.

Serratus Poſticus Superior,
Serratus Poſticus Inferior,
Splenius, or *Triangularis,*
Trigeminus,
Tranſverſalis,
Spinatus,
Recti Majores,
Recti Minores,
Obliqui Superiores,
Obliqui Inferiores,
Longiſſimus Dorſi,
Sacrolumbalis,
Cervicalis Deſcendens,
Sacer,

Semiſpinatus,
Quadratus Lumborum,
Pſoas Magnus,
Pſoas Parvus.

If you pleaſe to take off the *Thigh* from the *Trunk* of the Body, by dividing the *Os Ileon* from the *Os Sacrum*, the Diſſection of the ſubſequent *Muſcles* will the better be performed.

Iliacus Internus,
Glutæus Major,
Glutæus Medius,
Glutæus Minimus,
Pyriformis, or *Iliacus Externus*,
Obturator Internus,
Quadrageminus, or *Quadratus lumborum*,
Obturator Externus,
Membranoſus,
Sartorius,
Gracilis,
Rectus,
Vaſtus Externus,
Vaſtus Internus,
Biceps,
Seminervoſus,
Semimembranoſus,
Triceps,
Lividus,
Gaſterocnemius Externus,
Plantaris,
Gaſterocnemius Internus, or *Soleus*,
Suppoplitæus,
Flexor tertii Internodii, or *Perforans*,
Tibiæus Poſticus,
Flexor Pollicis,
Flexor ſecundi Internodii Pollicis,
Flexor ſecundi Internodii, or *Perforatus*,
Abductor Pollicis,
Adductor Pollicis,
Abductor Minimi Digiti,
Tranſverſalis Placentini,
Tibiæus Anticus,
Peronæus primus,
Peronæus ſecundus,
Extenſor Pollicis,
Extenſor tertii Internodii Digitorum,
Extenſor ſecundi Internodii Digitorum,
Interoſſei Pedis.

The Names of the Authors
Concern'd in this
TREATISE.

J. Aquapendens,
T. Bartholine,
J. Bauhine,
P. Borellus,
B. Bonacurtius,
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M. De Blegney.
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P. Barbett.
R. Columbus,
B. Cabrolius,
G. Croune,
S. Collins,
G. Cockburn,
B. Connor,
Jsb. Diemerbroeck,
M. Donatus,
G. Falloppius,
P. Foreſtus,
Galen,
Reg. De Graaf,
And. Guainerius,
Hippocrates,
Fab. Hildanus,
Jac. Hollerius,
A. Laurentius,
A. Luſitanus,
P. Lycoſthenes,
J. Oetheus,
J. C. Placentinus,
P. Pigray,
A. Paræus,
F. Platerus,
J. Riolanus,
M. Rulandus,
St. Riverius,
D. Sennertus,
Adr. Spigelius,
C. Scarborough,
N. Steno,
J. Swammerdamus,
J. Schenkius,
Jac. Silvius,
J. Valverdus,
A. Veſalius,
J. Veſlingius,
Vidus Vidii,
Du Verney,
F. Valeriola,
Valeſcus,
T. Williſſius,
G. Wierus,
R. Wiſeman.

ERRATA.

Folio 22. line 26. read *plucking him*, f. 26. l. 14. r. *became*, f. 34. l. 23. r. *motions*, f. 53. l. 1. r. *Jugale*, f. 38. l. 4. r. *Platyſma Myodes*, f. 66. l. 24. r. *eating*, fol. 73. l. 6 r. *petroſe*, f. 77. l. 23. r. *appoſite*, f. 81. l. 14. r. *appoſitely*, f. 16. l. 19. r. *when*, f. 84. l. 10. r. *Lobes*, f. 99. l. 23. r. *Forcipes*, f. 102. l 6. r. *Prague*, f 16. l. 24. r. *thickning*, f. 93. l. 4. r. *reaching*, f. 103. l. 24. r. *of one*, f. 115. l. 15. r. *diſtance*, f. 16. l. 20. r. *facile*, f. 120. l. 13. r. *Inferiores*, f. 95. l. 22. r. *opening it again*, f. 127. *the ſecond Story is left out by miſtake*, f. 151. l. 20. r. *Extenſion.*

A TREATISE OF Muſcular Diſſection.

A Letter to the Learned Dr. William Briggs, *Fellow of the* College of Phyſicians, *and* Royal Society, *and* Phyſician in Ordinary to His Majeſty.

WHEREIN

A General View being firſt taken of the Frame *of the* Humane Body, *the* Mechaniſm *of* Vital, *and other* Muſcular Motions, *is Examin'd, both in a Phyſical and Anatomical manner.*

By his Friend,

Dr. CONNOR, *Fellow of the* Royal Society, *and one of the* College of Phyſicians.

SIR,

I Have receiv'd your Letter, wherein you deſire me to give Mr. *Browne* what ſmall account I can of the *Mechaniſm* of *Muſcular Motion*; to be, as you mention, an *Ornament* to his *Treatiſe of Muſcles.* Mr. *Browne* himſelf did write to me before to the ſame purpoſe: I was deſirous to be excus'd from appearing in Print in another Perſon's Book, having nothing extraordinary to ſay that would be an Ornament to his Work, or a Reputation to my ſelf. I might, Sir, very juſtly excuſe my ſelf to you, having ſhew'd your ſelf ſo well vers'd in the *Structure* and *Motion* of *Muſcles*, in your ingenious Diſſertation of the *Eye*; for Mr. *Browne* would have more reaſon to apply himſelf to you, than to me, becauſe what you would have me ſay of *Muſcular Motion* muſt be imperfect and deficient; not only becauſe I had but *Two Days* to write it, before Mr. *Browne*'s Book was publiſh'd, but likewiſe becauſe the *Subject* it ſelf is very abſtruſe and difficult.

Motion, the Life of *Bodies*, is as unconceivable as the Origin of *Matter* in which it reſides: To call it the Body that *moves*, the Body *moved*, a relative *Mode* between both, or the pure *Will* of a Supreme *Mover*, is too abſtract to be mention'd in a *Phyſical Diſquiſition.* I will not enquire what *Motion* is, but what is its cauſe, particularly in *Humane Body*. It will perhaps ſeem eaſily anſwer'd, That *Bodies* are the cauſe of their own *motion*, ſince no body can be moved without the *check* or *impulſe* of another: But it will appear very intricate to unravel the different *Nature* and *Properties* of Bodies; I mean, the particular *bulk* and *figures* of their *Particles*, by which they produce the various *Phænomena*, or different *motions*, we obſerve in the World, particularly in Animals.

Before I endeavour to illuſtrate the Motions we obſerve in Animals, chiefly in our ſelves, I will take a ſtrict and ſhort view of the whole frame of the Humane Body, to find how its wonderful Make is curiouſly contrived, to perform the Functions deſign'd by Nature for its own preſervation. Our *Machine* is an unimitable piece of Architecture; it is ſupported, as Buildings are with *Pillars*, *Architraves*, and *Rafters*, by ſolid and durable *Bones* wonderfully joynted together, like Joyners Work, with *Tenons* and *Mortaiſes*, and faſten'd with ſtrong *Ligaments*, for fear any piece of the Prop ſhould be ſhov'd out of its place, and the Superſtructure fall to the Ground. Between the joynted ends of the Bones lies a *Lymphatic* or *Oily Juice*, which, like Greaſe in Coach-wheels, makes their motion more glib and eaſie; and the *Marrow* in their Cavities keeps them from being brittle, by rend'ring them limber by its Unctuous quality.

Over the Bones are ſpread ſeveral Lays of Muſcular or Fleſhy Subſtance interwoven with *Nerves*, Membranes, Fat, Glands, and Blood-veſſels: Theſe Muſcles, like ſo many diſtinct Ropes, ſerve to pull and move the Bones, and the reſt of the Body; for there is no viſible motion in the whole Body perform'd, but by a Muſcle, or a Muſcular Fibre, tho' moſt other Fibres have their ſyſtaltic or imperceptible contraction.

Within this noble Fabrick we find three Apartments, the *Belly*, *Breaſt*, and the *Head*: they are lin'd with Membranous Coats, and contain their reſpective *Viſcera* or *Vital parts*. In the lower Apartment are lodg'd the *Stomach*, *Guts*, *Meſentery*, *Lacteal Veſſels*, *Pecquet's Receptacle of the Chyle*, the *Liver*, *Pancreas*, *Spleen*, *Atrabilary Glands*, *Kidneys*, *Bladder*, *Parts of Generation*, the *Caul*, the *Vena Porta*, and a great many *Lymphatic Glands*. The Gulet, Stomach, and Guts are one continued Canal from the Mouth to the Fundament: The Stomach receives the Meat chew'd in the Mouth through the Gulet, and digeſts it into Chyle; the Chyle paſſes into the Guts, where it meets with two Liquors to diſſolve it farther, one from the *Pancreas*, and the Bile from the Liver; it is preſſed down along the Guts by their *periſtaltic motion*; the groſſeſt part, or Excrements, are carried to the Fundament, but the thinneſt and white part of it, call'd properly *Chyle*, paſſes into the Lacteal Veſſels, which gape into the ſides of the Guts, from thence it continues its Journey to the great *Receptacle of the Chyle* above the *Kidneys*, and being there joyned and thinned by ſeveral little Streams of *Lympha*, it aſcends thro' the Thoracic Duct to the Heart, where it is chang'd into Blood. The Kidneys ſtrain from the Blood its ſuperfluous *Serum*, and ſend it to its Ciſtern the Bladder. The Liver cleanſes the Blood of Gall, and diſcharges it into the Guts, to help digeſtion: the *Vena Porta* carries the Blood from all the floating parts of the *Abdomen*, into the Liver; and all the Lymphatic Glands of the Belly ſend their *Lympha* to the Thoracic Duct, from whence it is convey'd to the Heart, to be mix'd anew with the great Torrent of the Blood, from which it was firſt ſtrain'd.

The *Breaſt*, or ſecond Apartment, is ſeparated from the *Belly* by a Partition, call'd the *Diaphragm*; it is the Seat of the two chief Fountains of Life, the *Heart* and *Lungs*. The *Heart* is a ſtrong *Muſcle* with two Cavities, the right and left *Ventricle*: the right Ventricle receives the whole Maſs of Blood thro' the great *Vena Cava*, from all parts of the Body, and ſends it by the Pulmonary Artery into the Lungs, where being rarified by the Air forced into them by Reſpiration, it paſſes thro' the Pulmonary Veins into the left Ventricle of the Heart, which drives it with great force into the appending *Aorta*, or great *Artery*, and from thence thro' millions of Ramifications into all the parts, and even into the minuteſt Fibres of the whole Body; from whence it returns back to the Heart, as Rivers run to the Ocean from whence they came. The *Heart* is therefore *the Center of motion in us*; it ſends the Blood to the whole circumference of the Body, and like a *Pump*, or rather a *Syringe*, it forces the ſame back again, that by a conſtant circulation from *Center* to *Circumference*, and from *Circumference* to *Center*, it may enliven and nouriſh all the parts of the Body; for whenever by inward Diſeaſes, or by any great Wounds, this *Circulation* is interrupted, *Death* muſt neceſſarily enſue.

In the uppermoſt Room of all is lodged that Marrowy and ſoft Subſtance the *Brain*, the Seat of the *Soul*, and the Origin of all the *Senſes*: it is wrapt up in two Membranes; the ſtronger one, call'd *Dura Mater*, ſticks in ſeveral places to the inſide of the Skull; but the thinner cleaves every where very cloſely to the outſide of the *Brain*. The *Brain* it ſelf is divided into two parts; the upper and fore-part, which is the largeſt, is call'd properly the *Brain*; the lower and back-part is call'd *Cerebellum*, or little Brain: The Subſtance of both is much alike, as for its Uſe and Contexture, for the outſide of both is *Glandulous*, and of an Aſh-colour: It ſerves to ſtrain from the Blood that thin *airy* Fluid call'd *Animal Spirits*. The Pith or inſide of both is very white, and ſomething harder than the firſt; it is nothing elſe but the Origin of all the Nerves that ſuck up from the ambient Glands the Spirits which they ſeparate from the Blood, pour'd in among them from the *Carotid* and *Vertebral Arteries*. The Baſis of this Pith or Marrowy Subſtance is call'd *Medulla Oblongata*, which with the Marrow of the Back-bone is in a manner but one continued Brain, or one common Stock, out of which all the Nerves of the whole Body take their Origin; for Ten pairs of Nerves part from the Brain alone, and Thirty pairs from the Spinal Marrow, which make up all the Nerves of the whole Body; for there is not one Fibre in the whole Body that does not receive ſome Twig of a Nerve from one or other of theſe Forty pairs: I may indeed except the Bones and the Heart, for I cou'd never diſcover any Nerve in their Subſtance, which makes me believe, as I have hinted in my Experiments about the Heart, that the motion of the latter does not depend of the Nerves of the Brain. Every one of the Forty pairs of Nerves is a bundle of an infinite number of ſmaller ones, each of which is hollow, and conveys the Spirits either from the Brain or Spinal Marrow, to the place in which they terminate, and theſe Spirits cauſe Senſe and Motion where they arrive, for without them we neither could feel nor move any part of our Body; as is viſible in *Palſies* and *Apoplexies*. There are in the Brain ſeveral other Parts they give

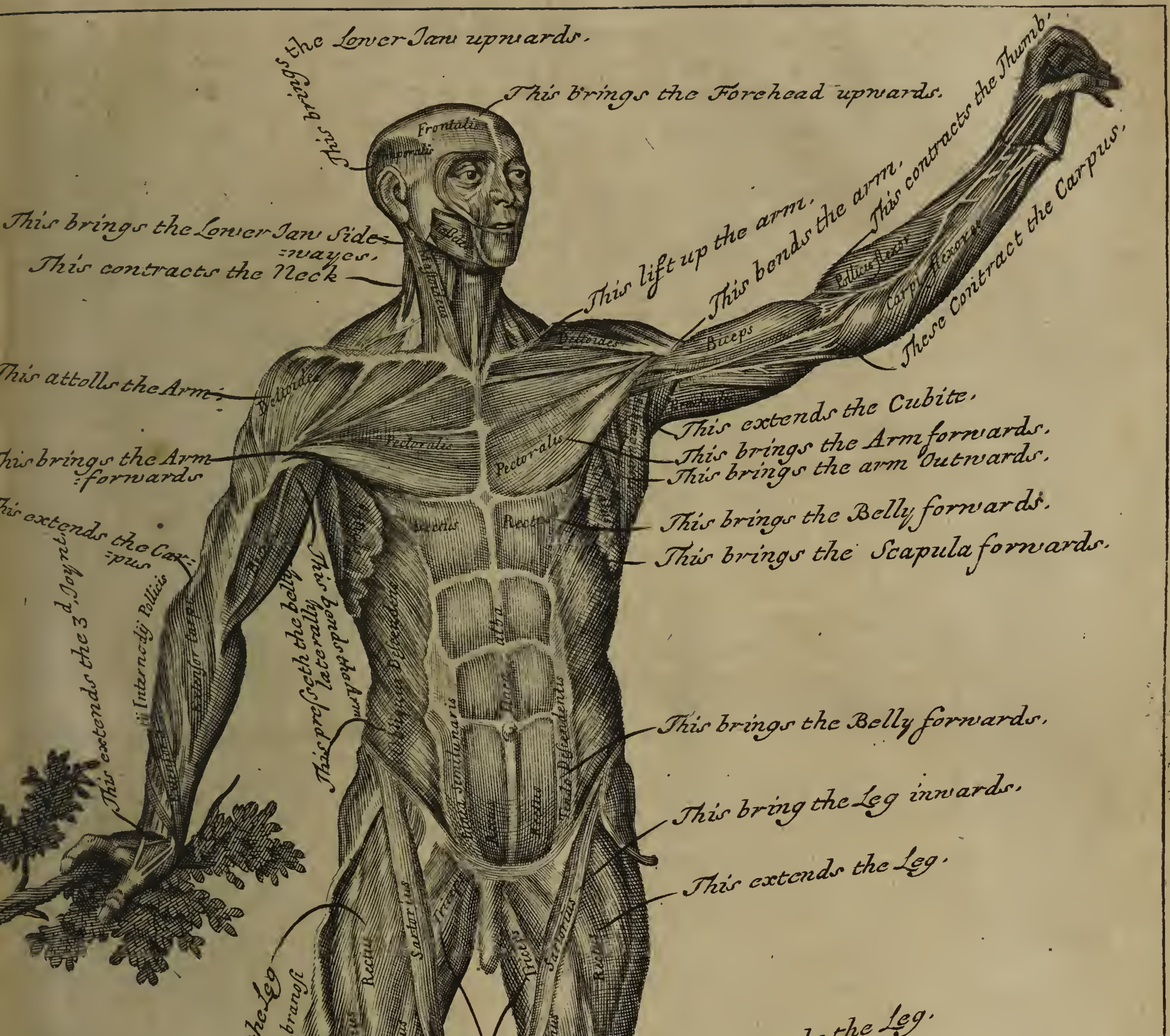
Names to, but becauſe the Uſe of them is incertain, they ſhall be nameleſs: for, to ſay that the *Soul* reſides in the *Glandula Pinealis*, the *Memory* in the *Corpus Calloſum*, the *Imagination* in the *Corpora Striata*, *Appetite* to Women in the *Nates* or *Teſtes*; that *Vital Motion* depends of the *Arbor Vitæ* of the *Cerebel*; would paſs better for *Poetical Fancies*, than for *Phyſical Enquiries*. I cannot notwithſtanding forget the four *Ventricles*, three of which are in the Brain, and the fourth in the Cerebel: They have all Communication with one another in the Baſis of the *Brain*; they ſerve to drain away the ſuperfluous Humors; they pour them into the *Funnel* of the *Brain*, from whence they are diſcharg'd, not into the Noſe, as was formerly believ'd, but through two *Sinus's* into the *Jugular Veins*, and from thence ſtreight to the *Heart*. I do not doubt but *Tobacco*, or other Medicaments given to make one ſneeze, will eaſe the Head, not by diſcharging any thing from the Brain, as is vulgarly thought, for there is no manner of Paſſage from the *Brain* to the *Noſe*, all the holes being ſtopt up by the Olfactory Nerve, but becauſe this Snuſh carries away, the *Mucus* or Slime that ſtagnates in the two *frontal*, the two *maxillar*, and the two *ſphenoide Sinus's*, all which open into the Noſtrils, and are lined with the ſame *Membrana Pituitaria* that the *Noſe* is.

All Parts of the Body have correſpondence with one another, the *Brain* with the *Heart*, the *Heart* with the *Brain*, and the whole *Body* with them both: By this Communication the whole Body ſuffers when any one part is diſorder'd; as, in a Pain of the *Toe*, all over out of order; for a *Toe* is made up of all the ſame integrant parts that the whole Body is, the Fabrick of the whole Body being made of *Bones*, *Griſtles*, *Ligaments*, *Muſcles*, *Fat*, *Glands*, *Veins*, *Arteries*, *Nerves*, *Lymphatic Veſſels*, *Membranes*, and *Fluids*; and all theſe are to be found in the *Toe* alone: ſo that as our *Body* is generally ſaid to be an Abridgment of the whole Univerſe, ſo a *Finger*, *Toe*, or other Parts, are in a manner our *whole Body* in *little*, tho' their *Figures* be different: And I cannot conceive or explain the *Action* or *Motion* of a *Finger*, or of any other Part whatſoever, without I have a clear Idea of the *Frame* and *Functions* of the whole *Body*, no more than I can underſtand or methodically cure any One inward *Diſeaſe* without a general *Idea* of the Source of all Diſeaſes.

Having thus, Sir, ſhortly ſurvey'd the *Frame of the Humane Body*, it is requiſite to examine the *Springs* that ſet the Machine going; for it is as neceſſary to obſerve the *Mechaniſm* with which a *Watch* moves, as it is to know the Excellency of the Workmanſhip, particularly when its motion is apt to be diſorder'd, as often that of the *Humane Body* is by *Diſeaſes*, and wants to be mended.

The two great *Agents* in our Body are, the *Motion* of the *Fluids*, and that of the *Solid Parts*: both depend immediately of one another; for as the *Fluids*, I mean the *Blood* and *Spirits*, give motion to the ſolid parts, ſo they mutually receive all their motion from them: Juſt as a Man that ſwings himſelf upon a ſlack Rope receives in himſelf the motion he gives it. The firſt motion in our Body after *Generation* in the *Womb*, is that of the *Fluids*; for the *Punctum Saliens*, or the little *Stamina* of the Heart, cannot move it ſelf, but it muſt receive its firſt motion from the *Fluids* contain'd in its Subſtance: Theſe *Fluids* receive their firſt motion from the *vivifying Sparkles* or *ferment of Man's Seed*, convey'd to them in *Coitu*, and this *primitive prolific motion* is continued and fomented in the *Germen*, by the ambient heat of the Mother's *Womb*, until the *Carina*, and all the

other


This brings the Lower Jaw upwards.
This brings the Forehead upwards.
Frontalis
Temporalis
This brings the Lower Jaw Side:wayes.
This contracts the Neck
Mastoideus
This lift up the arm.
This bends the arm.
This contracts the Thumb.
These Contract the Carpus.
Deltoides
Biceps
Pollicis flexor
Carpi flexores
his attolls the Arm
Deltoides
Pectoralis
Pectoralis
his brings the Arm :forwards
This extends the Cubite.
This brings the Arm forwards.
This brings the arm Outwards.
his extends the Car:pus
This extends the 3d. Joynt.
Interno dij Pollicis
Extensor carpi
This presseth the belly laterally
This bends the Arm
Rectus
Rectus
This brings the Belly forwards.
This brings the Scapula forwards.
Obliquus Descendens
Linea alba
Linea Semilunaris
Tendo Descendentis
Rectus
This brings the Belly forwards.
This bring the Leg inwards.
This extends the Leg.
This extends the Leg
Pars Membranosa
Rectus
Sartorius
Triceps
Triceps
Sartorius
Rectus
Vastus externus
Vastus Internus
Vastus Internus
This extends the Leg.
both these Extends the Legg.
This brings the Leg inwards.
This bring the Thigh inwards.

other *Organs*, gather ſtrength enough to move one another. Thus the little *Muſcular Filaments* of the *Heart* being firſt moved, they muſt neceſſarily, in contracting themſelves, preſs and crowd one another, and conſequently ſqueeze from between them, and from their little Ventricles, the Humour that moved them firſt, and drive it into the appending Arteries, to make room for another ſucceeding Humour, ſupply'd from the Liquor in which the *Carina*, or the whole *Embryo*, ſwims: This new fermenting Humour, with its *innate Air*, being admitted into the *Fibres* of the *Heart*, muſt give them a ſecond *Pulſation*, by which it is forced farther, as the firſt was, into the Arteries; and other ſmall rarified Draughts ſucceed conſtantly, which renew and continue the Pulſation of the *Heart*: by which it appears, that the *Fluids* and the *Heart* move one another reciprocally.

Having *en paſſant* hinted the Origin of *Vital Motion* in the *Fœtus* after Conception, I may now enquire into the *genuine Cauſe* of all other *Muſcular Motions* in us, whether voluntary or involuntary, after we are born. All *Anatomiſts* agree, that *Muſcles* and *Muſcular Fibres* are the *Inſtruments* of all viſible *motions* in our Body; for Parts that have loſt their *Muſcles* by Wounds, or that have had never any, as the *Skin*, *Brain*, *Liver*, *Lungs*, *Spleen*, *Kidnies*, *Teeth*, *Nails*, *Hair*, *Ears*, *Teſticles*, never move viſibly; and all parts that are provided with *Muſcles*, or even with *Muſcular Fibres*, as the *Stomach*, *Guts*, *Gulet*, *Iris*, *Sphincters*, the *Bladder*, are perceived to move. But it is not enough to know that *Muſcles* move all other parts of our Body; we muſt diſcover, if we can, what moves the *Muſcles* themſelves; otherwiſe we have no more ſatisfaction in obſerving the *motions* of our own Body, than in ſeeing a Boat in a calm day brought up againſt the Current of the *Thames* by the Tide, without knowing what forces the Tide it ſelf up. It is plain, that if a *Muſcle* is contracted, it muſt neceſſarily draw towards its Belly or middle, the Bone or other part it is faſten'd to: And if we could find out the Phyſical Cauſe of this Contraction, perhaps it would give us as much reaſon to admire our own Make, and the Wiſdom of our *Maker*, as any other Effect in Nature.

It is evident, that a *Muſcle* cannot move it ſelf, no more than any other Body; it muſt therefore be mov'd by ſome new matter that comes into it: there is no *matter* whatſoever that can come into it, but *Blood* and *Animal Spirits*; and conſequently the motion of a Muſcle muſt either proceed from the Spirits that flow into it through the Nerve, or from the Blood convey'd thither by the Artery, or from both Blood and Spirits together. It cannot proceed from the Blood alone, becauſe when the Nerve is cut or obſtructed, and the Spirits cannot come into the *Muſcle*, its motion ceaſes, as it appears in a *Palſical Limb*, which, tho' the Blood circulates freely thro' it, has neither *Motion* nor *Senſation*, for want of *Spirits*. Likewiſe when the *Artery* is cut or ty'd, and the *Muſcle* receives no Blood, tho' the *Spirits* have free acceſs to it, yet the *motion* of the *Muſcle* ceaſes; from whence it evidently follows, that *Muſcular Motion proceeds both from the Animal Spirits and from the Blood, met together in the Body of the Muſcle*; but how they perform this ſurprizing Effect, is what is very intricate to explain.

We cannot conceive that the *Blood* and *Spirits* do move the *Muſcle* by the rapidity of their *Circulation*, or by the quantity of *Motion* they both receive from the *Heart* and *Arteries*; and yet all the *motion* not only of the *Blood*, but likewiſe of the *Spirits*, is immediately derived from the

Impulſe of the Heart and Arteries together; for the *Spirits* borrow no motion from the *Brain* or *Nerves*, theſe having none of their own for want of Muſcles; and they give only a free paſſage to the Spirits thro' them: So that if every *Muſcle* was moved only by the *quantity of motion*, its proportion of *Blood* and *Spirits* receiv'd from the Heart, *Muſcles* would not have the hundredth part of the motion we obſerve in them.

It would be thus impoſſible that a Man, by the force of his Muſcles *Maſſeters*, ſhould raiſe a Hundred pound Weight in his Teeth; that by the ſtrength of the Muſcles of the Hand he cou'd break a Horſe-ſhoe in two, or lift up a heavy Chair in one Hand, with a Man ſitting in it; that *Tumblers*, *Vaulters*, *Rope-dancers*, cou'd move their Bodies with that activity and force; that *Porters* cou'd carry Five or Six hundred pound weight upon their Backs; that one Man alone cou'd lift above ground a Braſs Cannon of Fourteen hundred pound weight, as one of the King's Seamen has lately done. The quantity of this motion far exceeds that of the *Heart*; and to make it more clear, let us take any one Muſcle, for example, the two *Maſſeters*, or *Grinders*, that move the lower *Jaw*; they raiſe, as I mention'd, a hundred weight. To compare their *motion* with that of the *Heart*, there is no manner of proportion; for the motion of the Heart can hardly raiſe the weight of Threeſcore pound; or if I ſhould be ſo favourable as to allow the *Heart* force enough to raiſe a Hundred pound, which is more than I can demonſtrate; yet ſtill this would not prove that the *Maſſeters* could raiſe likewiſe the ſame weight, becauſe all this *motion* granted to the *Heart* is not, nor can be, communicated to every Stream of *Blood* and *Spirits* that flow into every *Muſcle*; becauſe it is divided and ſubdivided into as many thouſand little Portions of Motion as there are *Ramifications* of *Nerves* and *Arteries*, and Streams of *Blood* and *Spirits* in them. So that if a ſmall *Artery* contains only the hundredth part of *Blood* that the great *Aorta* holds, it will hardly have, or at moſt can but have, the hundredth part of the motion that the Heart has. Now, the bulk of both the M*aſſeters* is not the thouſandth part of the bulk of the whole Body, and conſequently does not receive the thouſandth part of the *Blood* and *Spirits*; from whence it evidently follows, that the *motion* of the M*aſſeters* would not be the thouſandth part of the *motion* of the *Heart*, and that inſtead of raiſing one hundred pound weight by the Teeth, they would not raiſe an ounce and a half; which is almoſt a leſſer force than is requiſite to move the M*uſcles* themſelves, or, at leaſt, the *Jaw-bone* they are faſten'd to. From all which I may reaſonably conclude, that *the power or motion of any* Muſcle *does not proceed from the rapidity with which the Blood and Spirits circulate through it, nor from the quantity of motion theſe have received from the Heart*; ſince the *motion* of the M*aſſeters* exceeds a thouſand times the degree of *motion* they can receive from their proportion of *Blood* and *Spirits* ſent 'em by the *Heart* and *Brain*; and ſince the degree of *motion* in the Heart of the Seaman, that lifted the Braſs Cannon of fourteen hundred pound weight, compar'd with the force of the *Blood* and *Spirits* of his whole Body, is at moſt but as one to fourteen, or perhaps as one to thirty.

Since therefore we ſee that the quantity of *motion* of the *Muſcles* far ſurpaſſes that of the *Blood* and *Spirits*, and that this addition of motion cannot be attributed to the *Muſcle*, which is only *paſſive* in it, nor to the Heart, as I have ſhew'd already; I muſt neceſſarily ſuppoſe, that the *Nature* of the *Blood* and *Spirits* is ſuch, that when they meet in the body of the *Muſcle*, they acquire new degrees of motion, which ſeparately they could not have; to underſtand which, we muſt have a clear notion of the Structure of a *Muſcle*, and of the nature of the *Animal Spirits*.

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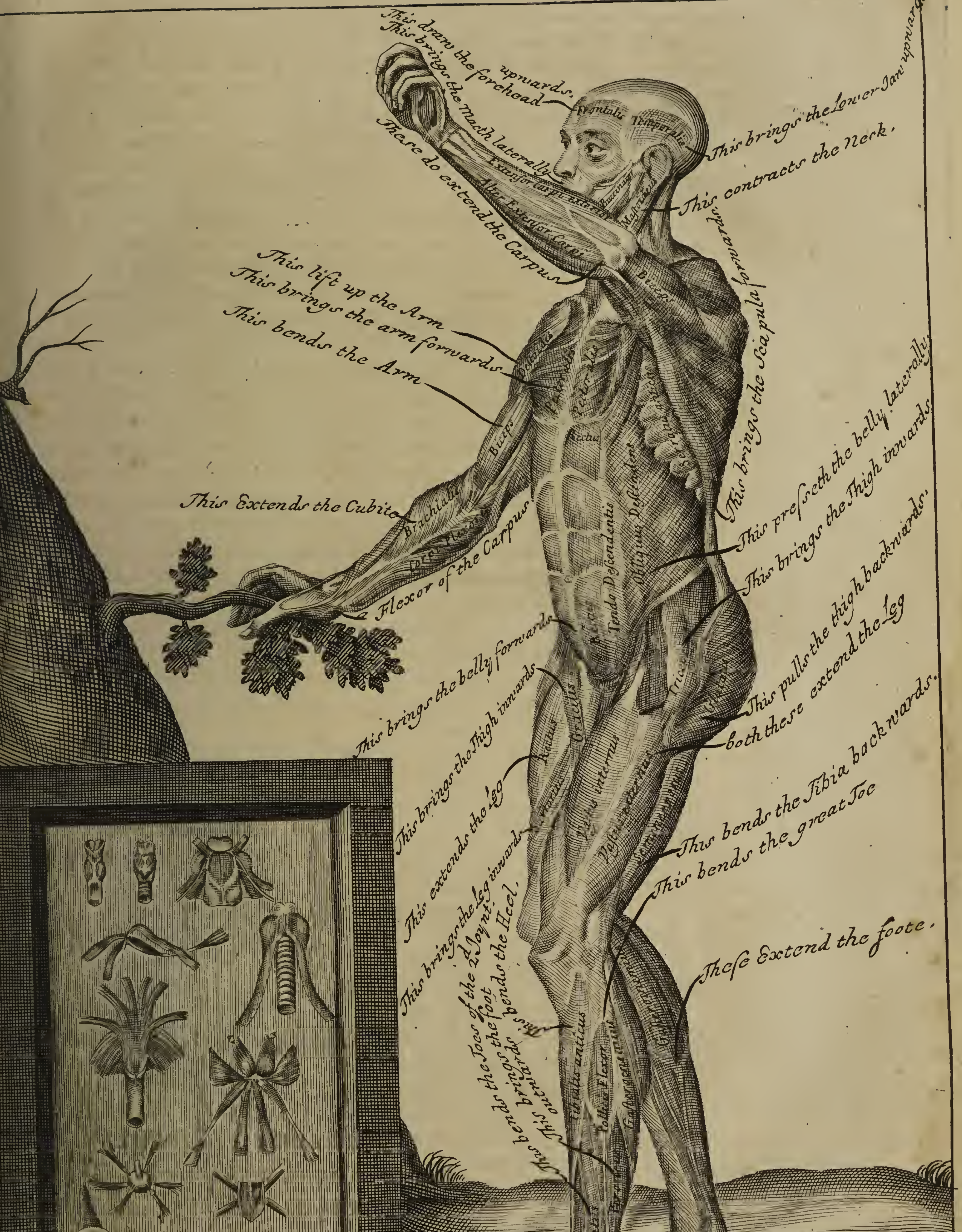

This draw the forehead upwards.
Frontalis
Temporalis
This brings the Lower Jaw upwards
This brings the Mouth laterally
Extensor carpi exterior
Buccinator
Mastoideus
This contracts the Neck.
These do extend the Carpus
Alter Extensor Carpi
Biceps
This brings the Scapula forwards
This lift up the Arm
This brings the arm forwards
This bends the Arm
Deltoides
Pectoralis
Pectoralis
Rectus
Serratus anticus
This Extends the Cubito
Brachialis
Biceps
Carpi Flexor
a Flexor of the Carpus
Tendo Descendentis
Obliquus Descendens
This preſseth the belly laterally
This brings the Thigh inwards
This brings the belly forwards
Rectus
This pulls the thigh backwards
both these extend the leg
Triceps
Gracilis
Rectus
This brings the Thigh inwards
This extends the leg
Sartorius
Vastus internus
Vastus externus
Semimembranosus
This bends the Tibia backwards.
This bends the great Toe
This brings the leg inwards
This bends the Toes of the 2d Joynt.
This brings the foot outwards
This bends the Heel,
These Extend the foote.
Tibialis anticus
Pollicis Flexor
Gastrocnemius
Perforatus
Peroneus

I need not inſiſt long upon the *Structure* of a *Muſcle*, it being very well known that it is a *fleſhy Rope* with two ſmall and compact Ends, and a large Belly, being a bundle of a great many ſmaller *Ropes* or *Fibres*, wrapt up together in a common *Membrane*, cloſely interwoven towards the Head and Tendon, and ſlack in the middle. The ropy *Fibres* are ſtretch'd in length from Head to Tendon, and are traverſed in the middle chiefly, by a few ſmall *Filaments*, to make their *contexture* more firm, not unlike that of a Net or Cane Chair. Every *Fibre* is a little *Tube*, and receives the *Blood* and *Spirits* into its *Cavity*; for the Blood does not circulate between the *Interſtices* of the *Fibres*, as ſome believe, but in their very Cavities, which is made manifeſt when I cut a *Muſcle* in length, there hardly is ſeen any Blood; but when I cut it acroſs, there guſhes immediately out of every Fibre a great quantity. So that I may ſay, that the Cavity of every Fibre of a *Muſcle* has its *Nerve*, *Artery*, and *Vein* to attend it; the *Nerve* and *Artery* furniſh *Spirits* and *Blood*, and the *Vein* ſerves to carry back to the Heart what has not been employ'd in nouriſhing or moving the Fibre. The Head of the *Muſcle* is faſten'd to one Bone, and the Tendon to another, and no *Muſcle* begins and ends in the ſame Bone; for then it would only ſerve to bend, and not to move it. Thoſe Phyſicians therefore ſeem to be miſtaken, who think the contraction of the Muſcle to be the cauſe why Bones are bent in the *Rickets*, ſince this cannot be, unleſs the *Muſcle* began and ended in the ſame *Bone*.

As for the *nature* of *Animal Spirits*, it is very difficult to determin it. Some maintain, there are none at all; others, that affirm there are, can never ſhew them, nor try any Experiment in living or dead *Bodies*, to diſcover their origin. It cannot notwithſtanding be doubted but there is a *fluid Subſtance* that paſſes through the *Nerves*, tho' we ſee no Cavity in them to let it paſs; yet I cannot be perſwaded that it is the moſt volatile Spirit, or the moſt refined part of the Blood, as moſt Phyſicians are of Opinion, becauſe if it did in the leaſt partake of the nature of the whole Blood, or of any of its *Principles*, *Earth*, *Water*, *Salt*, or *Sulphur*, it muſt be ſeen in the *Nerves*, as the Blood is in the *Arteries*, or *Lympha* in the *Lympheducts*; for let the *Spirit* of the *Blood*, taken out of it by *Chymiſtry*, be ever ſo often diſtilled again, and refined by Fire, it will ſtill be kept in Veſſels, and pour'd off from one Bottle into another, will appear in the form of a viſible Liquor.

The famous Dr. *Willis* did not ſcruple to ſay, that the Animal Spirits did partake of the *Nitre* of the *Air*, blown into the Blood from the Lungs by Reſpiration; and that theſe Nitro-aerial Spirits, as he calls them, meeting the ſulphureous part of the Blood in the lank Belly of the Muſcle, flaſhed, which he calls *Exploſion*, like Gunpowder, which is made of Nitre, Sulphur, and Charcoal: by this *Exploſion* the Muſcle is contracted or ſhortned, which contraction is *Muſcular motion*. With reſpect to this learned Author's Memory, I cannot conceive that the Nitre of the Air can get into the Lungs in that great quantity, as would be neceſſary to perform all the motions of the Body; for if it did come into the Blood in that vaſt quantity, far from rarifying the Blood, and heating us, it would coagulate the maſs, and chill the whole Body, as the *Spirit of Nitre*, the diſſolution of *Nitre* in Water, and all Preparations whatſoever of it, taken inwardly, conſtantly do. Beſides, granted the Animal Spirits were *Nitrous*, how can the Particles of *Nitre*, meeting the *Sulphureous part* of the *Blood* in the *Muſcle*, flaſh, without ſome ſparkles of Fire fit to kindle for the *Exploſion*; for Gunpowder, tho' it is made of this *Salt-petre* and *Sulphur*, never blows it ſelf up without a priming or foreign Fire to impart to it its firſt *motion* or *flame*.

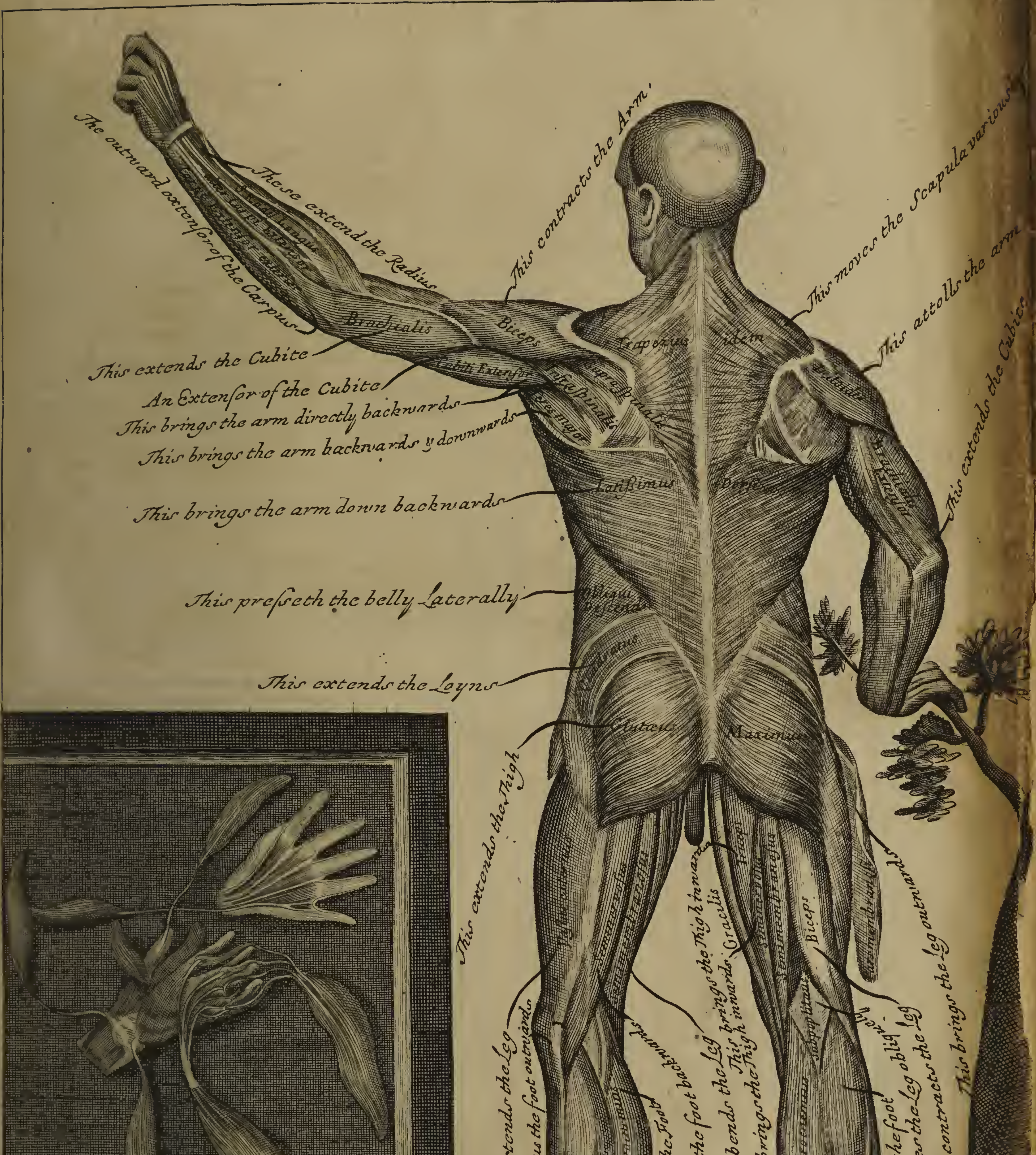
Now, Sir, ſince you will have me give you my blind Conjecture, I am rather of opinion, that *the Animal Spirits are nothing elſe but the pure Body of the Elaſtic Air, pour'd into the Blood from the Lungs, without any Nitre at all.* This Doctrine, tho' perhaps new to you, ſeems to me to ſuit better than any other Hypotheſis with the Effects of Reſpiration, with the motion of the Heart, with the rarefaction of the Blood, with the plenitude of the Veins and Arteries, with the effects of Cupping-glaſſes, with ſwooning in hot places, with breaking Wind backwards, with the filtration of the Spirits in the Brain, with their inviſibility in the Nerves, and with the Mechaniſm of Muſcular motion.

I have endeavour'd to refute the Doctrine of the *Nitre* of the *Air* in my Latin Treatiſe *de Antris Lethiferis*, and have proved in the ſame *Book*, that the body of the Air not only is breathed into the Lungs, but that likewiſe it paſſes farther from *Diſſert. Medico-phyſ. p. 72.*

the *Bronchia*, and their appending *Bladders*, into the *maſs* of *Blood*: this is evident, becauſe if the *Lungs* of a dead *Animal* be well clear'd from the Clods of *Blood* with an injection through the *Pulmoaary Artery*, we may blow the Air from the *Windpipe* through the Lungs into the left Ventricle of the Heart. Beſides, it cannot be doubted but the *Air* will find way into the Blood thro' the ſame *Pores* of the Lungs which the thick ſteams of the Blood, which come out in Expiration, paſs through; and through which groſs *Damps*, *Peſtilential Vapours*, and, as they ſay, the *Nitre of the Air* make their way into our Body.

To conceive the Effect this Air operates in our *Blood*, it is fit to take notice, that *Air* is capable of being condens'd and rarified, that is, a Pint of *Air* can be preſſed into the compaſs of a half-pint, and a half-pint can be dilated ſo far as to fill a whole quart, when all preſſure is taken away, as we obſerve in the Air-pump. The Air is always condenſed in a cold place, and rarified in a hot one: for if you fill but the fourth part of a Bladder with Air, and afterwards ſeal the mouth of the Bladder that the Air ſhould not get out, then put the Bladder in hot Water, the little *Air* contained in it will ſpread ſo violently, that it will burſt the Bladder, if the Water be very hot. Since therefore the *Air* expands it ſelf two ways, either when the preſſure of the *Atmoſphere* is taken away, as in a ſeal'd Bladder, in the Air-pump, or when it is in a warm place, as in the Bladder dipt in hot Water, we may eaſily believe it will do the ſame in our Body, for both Reaſons: Firſt, becauſe when it has paſſed out of the Lungs into the Heart, and into hollow Veſſels, it is in a manner out of the reach of the preſſure of the ambient *Air*, and conſequently muſt dilate it ſelf upon that account alone; beſides, it mixes it ſelf with hot Blood, which boils and ferments in the *Arteries* and *Veins*, and its expanſion muſt likewiſe encreaſe conſiderably for this reaſon. But the Air cannot expand it ſelf in our Bodies without expanding and vivifying at the ſame time the *Blood* in which it is contained; this is the reaſon that the Blood that has paſſed through the Lungs is much more thin, more florid, more frothy, and more rarified than any other; here needs no *Nitre* to thin the Blood, the Elaſticity of the *Air* will do more effectually all that is attributed to its pretended Vertue. For little ſtreams of Air being received into the Blood through all the Bladders of the Lungs at once, will rarifie ſufficiently that quota of Blood which the Lungs then contain, and the Air that is to come in by the next Inſpiration will rarifie the ſucceeding waves of Blood; ſo that the Circulation of the Blood and Reſpiration keeping time with one another, the Blood cannot want *Air* enough to be fermented and rarified. It is not enough that the *Air* ſhould rarifie the Blood in the Lungs, but it is likewiſe neceſſary that the ſame Air ſhould circulate with the Blood through all the Veſſels and Parts of the body, otherwiſe it would coagulate, and would be too thick to continue its circulation; for the *Air* keeps the ſulphureous parts aſunder, and hinders them from meeting, to prevent a coagulation: it is this *Air* that ſwells the Blood to fill up the Veins and Arteries while we are alive: for when we are dead, and this Air is evaporated, the Veins alone are hardly half full, and the Arteries are quite empty. It is the Springineſs of this Air that makes the *Blood* and *Fleſh* ſwell when Cupping-glaſſes are apply'd to any part of the Skin; it is this *Air* that fills up all them Bladders we ſee in Butchers Meat newly kill'd; it is it that fills the *Stomach*, *Guts*, and all the hollow places of our *Body*. *Air is*, in ſhort, *the Spirit and Life of the Blood, as Blood is the Life of the Body*, for without it the *Chyle* cou'd never be changed into Blood, the *Principles* of the *Blood* could never be exalted, nor kept in motion; and we ſee that when one is bled, that Blood which boil'd a minute before in his Veins, when its *Air* flies away, turns immediately into a dead *Clod*, without *fermentation* or *fluidity*.

Let us now examin how much this Air may ſerve us to explain the Mechaniſm of *Muſcular motion*, and let us trace the Blood impregnated with this *Air* from the left *Ventricle* of Heart, into the Subſtance of the Brain: *The Brain is a Sponge without any viſible Cells, and a Gland without any viſible Acini*; ſo that its *Pores*, and the Cavities of the *Nerves*, are too ſmall to admit any Part or Principle of the real Subſtance of the Blood within them. Having, after long Enquiry, computed exactly the diſpropotion between the groſneſs of the Parts of the Blood, and the minuteneſs of the Glands of the *Brain*, and of their appending *Nerves*; and having conſidered the ſuitable Proportion between the ſame *Glands* and *Nerves*, and the *Air* contained in the Blood, I never could conceive, that any other Subſtance was fine or ſubtile enough, to make its way thro' them, beſides the thin *Air* which they


The outward extenſor of the Carpus
Those extend the Radius
This contracts the Arm.
This moves the Scapula various
This attolls the arm
This extends the Cubite
Brachialis
Biceps
Trapezius
idem
Deltoides
This extends the Cubite
An Extenſor of the Cubite
Cubiti Extenſor
This brings the arm directly backwards
Infraſpinalis
Supraſpinalis
This brings the arm backwards & downwards
Teres major
Latiſſimus
Dorſi
This brings the arm down backwards
This preſſeth the belly Laterally
Obliqui Deſcend.
This extends the Loyns
Gluteus
Maximus
This extends the Thigh
Gracilis
Biceps
This brings the Thigh inwards
This extends the Leg
This brings Peroneus the foot outwards
This extends the Foot
This bends the foot backwards
This bends the Leg
This brings the Thigh inwards
This brings the Thigh inwards
This extends the foot
This carryes the Leg obliquely
This contracts the Leg
This brings the leg outwards
Tendo ejus
ejus Tendo

are ſupplyed with from the Blood: by which I am obliged to believe, *that the Animal Spirits are nothing elſe but the pure body of the Air ſtrained from the blood in the Glands or Strainers of the brain, and conveyed into the Cavity of the Nerves.* I cannot ſay, that the Animal Spirits are ſuch pure Air, but that they may perhaps be moiſtened with ſome thin Vapour from the Blood. Since therefore the Air about us, and that which we breath, cannot be ſeen by our naked Eyes, it is no wonder why the ſame Air ſhould not be viſible in the Nerve, when we cut it. The Motion of this *Airy Fluid* in the Nerve, cannot naturally be quicker than that of the Blood in the *Arteries*; becauſe the Brain cannot ſieve the Spirits, faſter than the *Arteries* ſupply it with Blood and Air; ſo that the Circulation of the Blood, and that of the Animal Spirits muſt keep due time with one another, unleſs the Motion of the latter be immediately haſtned by the Influence or free Command of the Mind in voluntary Actions, as in Leaping, Dancing or Running; or unleſs ſome outward Body, or inward Diſeaſe gives the Nerves and Spirits ſome ſudden motion; as when a Pin pricks unexpectedly the Toe, a Viper or Tarantula bites, a Scorpion ſtings, a Tendon is wounded, a Vomit gnaws the Stomach, Phrenſies diſtract the Mind, Convulſions the Body, and Madneſs both. Theſe outward Impreſſions, or inward Storms encreaſe prodigiouſly the rapidity of the Spirits, far beyond their natural Motion.

If, Sir, you will grant me, as I hardly conceive how it can be denyed, that the Animal Spirits are nothing but Air: I need not depend of the natural Motion of the Blood nor Spirits, nor of the pretended *Vertue* of a ſuppoſed *Nitre*, to explain the Power of Muſcles, or the multiplyed Force of *Muſcular Motion*; for the Elaſticity of the Air alone is capable of performing this Effect in the following Manner.

The Animal Spirits, that were before a rarefied Air in the Blood, are now a condenſed one in the Nerves; for the Air is always condenſed when it is preſſed into a narrower Compaſs, as the Nerves are in reſpect of the Arteries; this condenſed Air paſſing from the Extremity of the Nerve into the looſe and ſlack Cavity of the Fibres of the Muſcles, and meeting there, as it did before in the Lungs, the warm Blood poured in by the extremity of the Capillary Artery, it muſt neceſſarily expand it ſelf, and the Blood both; I mean, the Blood and Spirits muſt acquire together a new degree of Rarefaction in the belly of the Fibre; It is not poſſible for them both to be thus rarefied without ſwelling the belly of the Fibre, nor can the belly of the Fibre be dilated, without drawing its two ends nearer one another, as when a bladder is blown up with breath, its two ends draw towards the Centre; and conſequently, all the Fibres of the Muſcle being ſwelled up in the ſame time, which Swelling I call *Muſcular Motion*, the bone or part to which they are fixed, muſt be pulled towards the Belly of the *muſcle*, and the motion of the bone muſt be viſible, unleſs in the ſame time it is pulled with equal force in the oppoſite ſide, by an *Antagoniſt muſcle*: For then the *bone*, like the *maſt* of a Ship pulled all about by Cables of equal Strength, will reſt without any viſible motion, tho, all the *muſcles* are in Contraction in the ſame inſtant, until either by cutting a muſcular Rope of one ſide, or by determining more Spirits into the *Antagoniſt* of the other, the ballance is broke: then the bone muſt be viſibly moved by the prevalent Contraction of one of the *Antagoniſts*.

No body can doubt, but that the belly of the *muſcle* is ſwelled in its Contraction, becauſe if you put your open Hand into a pot of Water, and then ſhut your Fiſt, you will find the Water riſe, by the ſwelling of the *muſcles* of the Hand: This Swelling cannot come from any new blood that comes into the muſcles; for the blood is rather driven out of them in their contraction, as we experience in bleeding, where the Vein bleeds better when we ſhut our Fiſt than when we keep it open; ſo that the muſcle is never more empty of blood than in its contraction: From whence therefore could this ſwelling come, but from the rarefaction of the *Elaſtic Spirits* in the Cavity of the *muſcular* Fibres? Another convincing reaſon, that the Muſcles are ſwelled in Contraction, is a Perſon that has one Limb ſound, and the other palſical; the palſical Limb is wither'd, and conſiderably leſſer than the other, becauſe it wants Spirits to diſtend the Muſcular Fibres.

Some perhaps will allow, that the *Animal Spirits* are pure *Air*, and that they rarifie the blood, and diſtend the *muſcular* Fibres; but they will ſtill ask, How can this ſudden Rarefaction in the Muſcle multiply ſo prodigiouſly the natural motion of the Blood and Spirits, as that the two *maſſeters* will raiſe in the Teeth a hundred pound weight? However the matter of Fact is undoubtedly true; and we need not be ſo much ſurpriſed at it, when we ſee Weights infinitely more conſiderable raiſed every day by the Spring of the Air: Is it not with this Rarefaction, that Gun-powder blows up huge Rocks and Fortreſſes? That Cannons ſhatter Walls regularly fortifyed? That great Spouts are raiſed in Rivers, and in the main Sea? That a bladder half full of Air put into hot Water, burſts? That a bladder quarter full of Air, put into the Air Pump, raiſes a Weight ten thouſand times heavier than the Air that ſwells it? What wonder therefore is it, that two large, tho' ſhort *muſcles*, as the *maſſeters* are, made up each of above two thouſand little *fiſtulous* Cords knit faſt together, and each Cord ſwelled and contracted by rarified blood and ſpirits, and acting all in conſort at once, ſhould raiſe a Weight of a hundred pound. Since, if I take a common ſtrong Rope that is dry, and faſten one End of it to a high Beam, and let the other End hang down perpendicularly to the Ground, afterwards tye to it juſt near the Ground, any weight, that the Rope can raiſe without breaking, then wet all the Rope with Water; in a little time the Rope impregnated with the water, will ſo contract it ſelf, as to raiſe above Ground this weight, be it ever ſo heavy. If therefore common Water, without Rarifaction, or any other viſible Motion, only that of *Fluid*, ſoaked up in, and between the Threads of a dead Rope, ſhrinks and ſhortens it ſo viſibly, notwithſtanding the reſiſtance of ſo great a weight; what muſt not rarified *Blood* and *Spirits* do in the hollow Strings of a living Muſcle?

It would be too long here, to enquire into the Cauſe of *Voluntary* and *Involentary* Motion; I will only ſay, that Motion cannot be *Involuntary*; becauſe the Muſcles that are ſubject to it, as the *Heart*, *Diaphragm*, and intercoſtal Muſcles, receive Nerves from the *Cerebel*, as Dr. *Willis* has aſſerted, but becauſe they have no true *Antagoniſts*; for a great many parts borrow their Spirits from the *Cerebel*, that are ſubject only to voluntary Motions, as the *Tongue*, *Eye*, *Mouth*, and all the *Face*, which receive Branches from the fifth, ſixth, and eighth pair of Nerves; and the *Heart* moves involuntarily, after all the Nerves, I mean the eighth pair, and the *Intercoſtals*, that are pretended to come to it from the *Cerebel*, are entirely cut. The Motion of the Heart muſt be then neceſſarily continued by the Blood and Air, that come freſhly rarifyed into it from the Lungs. If, Sir, I had more time, I could perhaps illuſtrate and prove this Opinion with a great many other material Arguments; but ſince I undertook it only to anſwer your Requeſt, I hope you will be pleaſed to make Apology for what I told you muſt be deficient in it, I am,

SIR,

Your very Obedient Friend and Servant,

Bernard Connor.

London, *Brown-low-ſtreet*,
July 16th. 1698.

I *Have thought here convenient, to ſet before this* Treatiſe *of* Muſcles, *the Honoured* Dr. Connor's *Philoſophical Account of the* **Mechaniſm of Muſcular Motion**, *for the Curioſity and Satisfaction of ſuch, as are not only deſirous to know how* Muſcles *move all other Parts of the Body, but likewiſe to be informed of the Genuine Cauſes of their own Natural Motion. I need not here enlarge on the* Drs. *Skill in Anatomical Diſquiſitions, his Travels all over* Europe, *and his Chymical and Anatomical* Lectures *and* Experiments *in both* Univerſities, *and here at* London, *for ſome Years laſt paſt; with what he hath Publiſhed of theſe Matters, have given ſufficient Teſtimony of his Capacity in all the Parts of Phyſick: I will therefore begin my own Deſcription of the* Series *and* Structure *of the* Muſcles *in the Manner following.*

Lecture I.

In which are contain'd the MUSCLES of the Lower Belly, and its adjacent Parts.

Obliquus Deſcendens,
Obliquus Aſcendens,
Rectus,
Pyramidalis,
Tranſverſus,
Cremaſteres,
Dartos,
Muſculi Clitoridis,
Directores, } *Penis.*
Acceleratores, } *Penis.*

Obliquus Deſcendens:

OR,

The Oblique Deſcending Muſcle.

NOTHING but an Almighty Contrivance could have Framed and Interwoven ſo Artificial, and ſo exquiſitely uſeful a fleſhy Compreſs or Bandage for the *Lower Belly*, which ſerves not only as a warm covering to it, but brings it alſo into a round Shape, and Form: And for our greater admiration hereof, altho' at the firſt view, this Carnous

This compreſſeth the *Belly* laterally.

Expanſion ſeems as it were made all of a piece, yet it is to be divided into ſeveral pair of *Muſcles*, by ſuch Maſters of *Anatomy* who have been converſant in Diſſections, where we may plainly ſee, as they appear in divers ſhapes, ſo do they carry in them various courſes of *Fibres*, all which demonſtrate their being framed as ſo many different Machines deſign'd for diverſity of *Tonick* Motions, here planted on purpoſe for enwrapping the *Bowels* lodg'd within their encloſures, and ſecuring them in their proper Places, and due Centres.

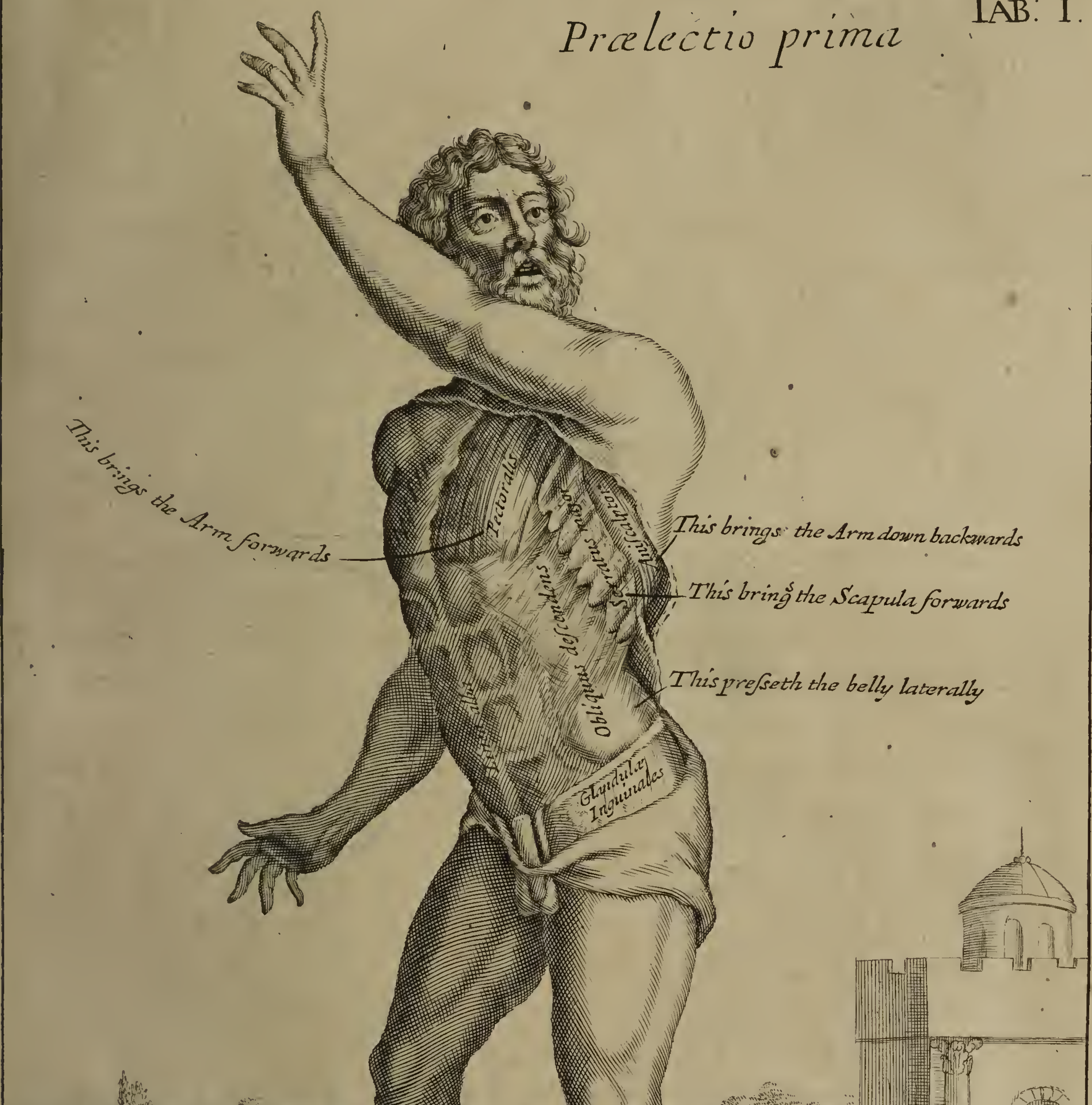
Nor has Nature been leſs careful in appointing them their ſeveral apartments, for their readier exerciſes of theſe their ſeparate motions, ſome of theſe being planted laterally, and yet ſeen to joyn with the *Right Muſcles*, as are the *Oblique Deſcendent*, *Oblique Aſcendent*, & the *Tranſverſe Muſcles*; all which, as they have *Tendons* marching upwards towards the middle of the *Abdomen*, ſo are they inſerted, and centred with a *Membranous Expanſion* into the *Linea Alba*, and are afterwards annext to the *Right Muſcles*, ſerving as Braces to keep up theſe their Triangular Coverings; at the bottom or Baſis of which, the *Pyramidals* are ſeen to ariſe, who in their aſcent, making one long Tendon, inſerting its ſelf into the *Navel*, or ſometimes ſeen terminating, either above, or below it, into the *Linea Alba*, where they are implanted under each other, making a thick *Arch* as it were, tho' in truth, they are melted into divers *Arches*, not only for guarding the Inward Parts from Cold, but for the exemplifying and enlarging their Dimenſions, in making more room for the Bowels (as the *Liver*, *Stomach*, *Guts*, &c.) to move in, when ever they may be depreſt by the *Diaphragm* in Inſpiration.

And as moſt of the parts of the Lower Belly are floating, looſe, and relaxt, ſo alſo are they ſpongy and greaſy, their Texture being looſe, and they being bedewed with an infinite number of *Veſſels*, are many times ſeen to run into putrefaction; for when the Aire once enters their ſubſtances, they are ſoon ſeen to condenſe the blood which gave them life, by their being too long expoſed thereto; and theſe parts being at any time deprived of the Bloods motion, which carries in it both Life and Heat, there muſt naturally follow a Mortification in the Parts.

And if we conſider, that the *Peritonæum* is ſeated juſt above the *Omentum* and *Meſentery*, the two only *Repoſitories* of Fat, by which 'tis actually ſeparated from the Parts by heat, 'tis eaſily underſtood that theſe parts continually oyling and bedewing the Fibres of the *Peritonæum*, do ſo ſoften and extend it, that they readily

make

Prælectio prima


This brings the Arm forwards
Pectoralis
Latiſſimus
Serratus major
This brings the Arm down backwards
This brings the Scapula forwards
Obliquus deſcendens
This preſseth the belly laterally
Rectus
Glandulæ Inguinales

make it give way to any impulſe whatever, either hapning by blows, or any other accident. And the *Abdominal Muſcles*, whoſe fleſhy Expanſions do garniſh the lateral parts, whilſt their *Aponeuroſis* do take poſſeſſion of the fore parts of the three *Regions*, have three of its *Muſcles* ſeen perforated towards the *Groins*, for the paſſage of the *Spermatick Veſſels*; and as the Tendons of the *Oblique deſcending Muſcles* do paſs downwards, and the *Oblique Aſcending* do paſs *upwards* under them, and the *Tranſverſe* do cover the *Flanks*, ſo thoſe of the *right Muſcles* do march *upwards* all along the ſides of the *Linea Alba*; by which various ſituations and diſpoſitions, they are ſeen to poize and ballance all the parts of the lower Belly, when ever they become contracted in the time of *Expiration*; and being thus cloſely and firmly put together, they moſt certainly do keep the Belly in a perfect level.

And if we conſider theſe as we ought, we may hence make a ready gueſs at the Original Cauſes of *Ruptures*, which do commonly happen in theſe parts; eſpecially if we do obſerve their *Mechaniſm*, wherein we may find ſomething worth our curioſity, conſidering, that *Violent Blows*, *great Shakings*, *long Courſes*, *Exceſs of Venery*, *Dancing*, *Vaulting*, and the like, are not only capable of moving the *Guts*, but of removing them alſo, and turning them from their proper Originations and Connexions; where, in many, or moſt of them, we find the Guts are preſt or beat down by the *Diaphragm* & the *Abdominal Muſcles*, which by their violent and reiterated ſhakings may oblige either the *Kell*, or the *Guts*, ſo to ſtrike againſt the ſurface of the *Peritonæum*, that they have many times been ſeen to break through the inward parts thereof.

Having thus made ſome uſeful Annotations about the *Muſcles* of the Lower Belly in general, by way of *Introduction*, We now come to deſcribe them as they are ſeen to ariſe in diſſection, beginning with this, both in reſpect of its largeneſs, and its Situation, it taking its Name from its rank of Fibres marching obliquely downwards, being partly fleſhy and partly Tendinous, and ariſing from the 6th. 7th. 8th. and 9th. Ribs indented, or indenting themſelves into the carnous *Dentiform proceſſes* of the *Serratus Major Anticus*, and as *Diemerbroeck* writes, ſometimes ſeen to ariſe from the 10th. & 11th. Ribs, and is alſo membranous from the *Tranſverſe proceſſes* of the *Lumbal Vertebres*, and paſſing to the *Linea Alba*, and *Os Pubis*, by a broad Tendon, it is let into the middle of the *Abdomen*, and is not to be ſeparated from the ſubjacent Tendons of the *Oblique Aſcendent Muſcle*, without difficulty. This Muſcle for the moſt part being fleſhy in its Origination, and inſerted with a Membranous Expanſion into the *Linea Alba*, is perforated by the *Cremaſters*, and in them are included the Spermatick Arteries and Veins near the *Os Pubis*.

Obſervat. This Tendon being either rent or ſtretcht with the next under it, and the *Inteſtines* or *Kell* paſſing through them into the *Inguen*, or *Scrotum*, occaſions either an *Inteſtinal* or *Omental Rupture.*

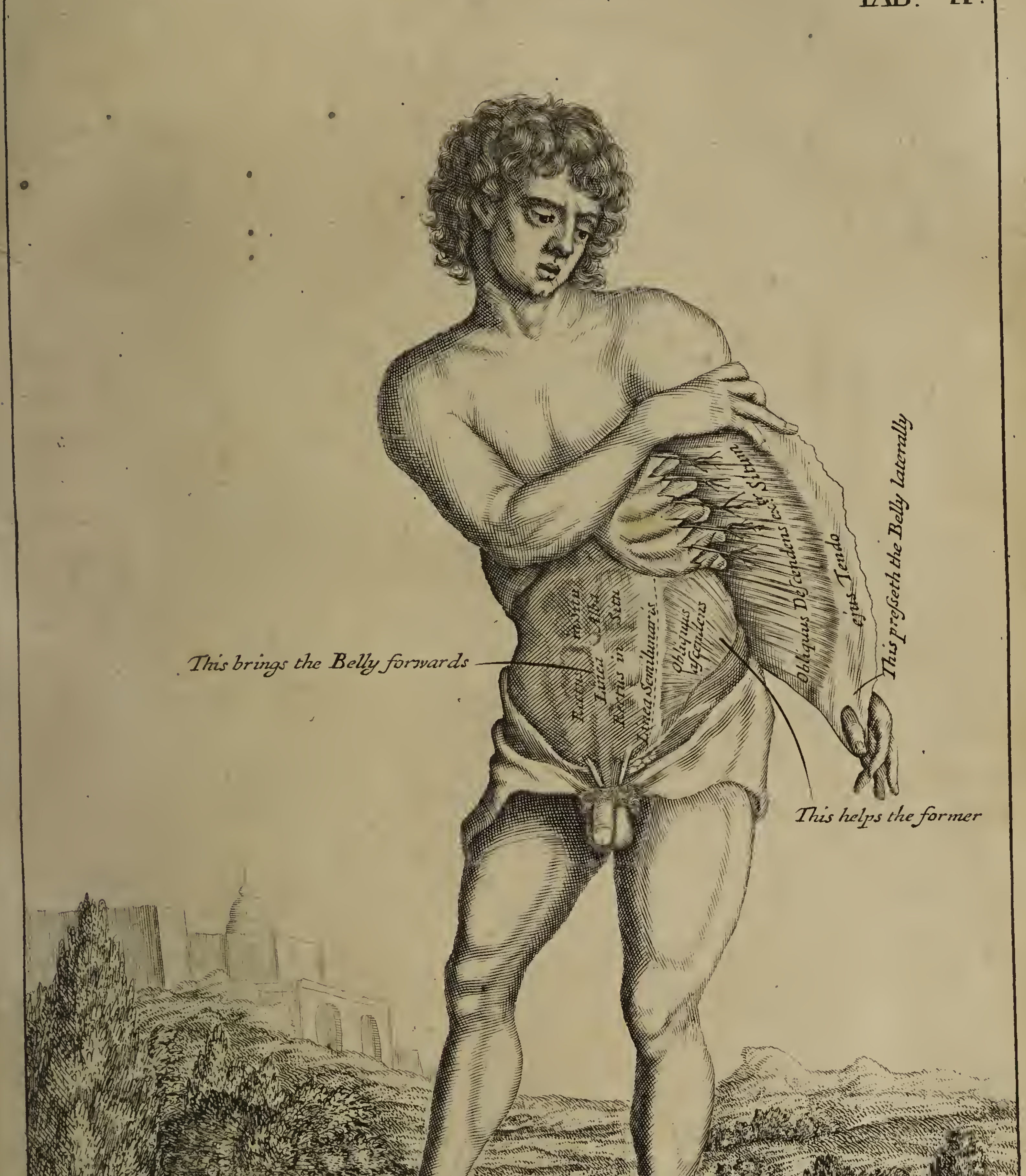
Annotat. To diſſect this Muſcle aright, you muſt divide the *Latiſſimus Dorſi* from him very low, that you may more readily arrive at his *Lumbal Origination*; then, by paſſing your *Probe* between the two Tendons, you are to divide the upper from the lower, the whole Length of the *Abdomen.*

Uſe. *Columbus* and *Laurentius* write the chief Uſe of this Muſcle, is to contract the *Trunk* of the Body, and promote free Breathing; and that contrary to all other *Muſcles*, theſe of the *lower Belly* appear crooked when they do not work, and that they turn inwards when they do.

Hiſtory. In the Year 1684, coming from *Windſor*, I was ſent for to dreſs one Mr. *Dorington*, who was run through the Body by Sir *W. C.* at the *Bell* Tavern in *Weſtminſter*, where finding a good part of the *Kell* hanging out of the Wound, beginning to turn colour, I immediately cut it off, and having cleared the Wound from Blood, I ſtitcht it up, leaving empty Spaces between each Stitch for the Blood, or any Ichor to diſcharge its ſelf by, and with convenient Boulſters and Compreſſes I concluded my firſt Dreſſings, having preſcribed him an Emulſion, a Traumatick Drink, with a Cordial Julep to refreſh his Spirits, &c. The next day I called (Mr. *Page*, and Mr. *Cockain*, who were then Maſter and Warden of our Company) to my Aſſiſtance, as is uſual in theſe dangerous Caſes; and tho' we then found him in ſo very low and weak Condition, that his Excrements came involuntarily from him, and that he was troubled with continual Faintings and cold Sweats, which gave us ſufficient Cauſe of ſuſpecting his Recovery; yet by Gods Bleſſings, and my Care of him, I perfectly cured him, and he is very well, and in perfect Health at the Writing hereof.

This you have ſhewn at Tab. I, *in its place, and in* Tab. II. *it is laid bare with its Membranous Part.*

TAB. II.


This brings the Belly forwards
Rectus [illegible]
Linea Alba
Rectus in Situ
Linea Semilunaris
Obliquus Ascendens
Obliquus Descendens ex Situ
ejus Tendo
This preſseth the Belly laterally
This helps the former

Obliquus Aſcendens, or the *Oblique Aſcendent Muſcle.*

THIS is planted under the former, with Fibres obliquely aſcending from the *Appendix* of the *Os Ileon*, it having a three-fold Origination, firſt fleſhy under the 11*th.* and 12*th.* Ribs, whoſe advantageous Situation conduceth much towards the cloſing of the *Trunk*, by its Contraction in Expiration, whence ariſeth a Relaxation of the *Diaphragm*, it being reduced to an *Arch*, and the *Guts* and *Stomach* being elevated by the compreſſion of the *Abdominal Muſcles*, are reduced to their proper places, as Dr. *Collins* obſerves. Its ſecond Origination is Tendinous, and ariſeth from the Spines of the *Os Sacrum*, and the *Tranſverſe proceſſes* of the *Loyns*; the third being fleſhy, and ariſing from the *Appendix* of the *Os Ileon*, and inſerting its ſelf with a Membranous expanſion into the *Linea Alba*, receives a perforation by the *Cremaſter Muſcles*, and *Spermatick Veſſels*, ſomewhat above the former, as is frequently ſhewn by *Diſſection*.

This helps the former in Compreſſion.

I conceive that theſe *Oblique Aſcending Muſcles* lodging juſt under the former, and running counter with them in their Fibres, do keep them in Oblique Aſcending *Angles*.

Obſervat.

Again, when the ſeveral *Abdominal Muſcles* do variouſly contract themſelves inwards, they are allowed to preſs down the Excrement, and ſend it forwards, and at the ſame time ſaid to reduce the *Stomach* and *Guts* to their proper places, they being *Antagoniſts* to the *Diaphragm*; which, while moving, they bring it into a plain, when it enlargeth the Trunks capacity, making a way for the *Lungs* to fill themſelves with Air, and preſſing down both the *Stomach* and *Guts* in their expanſions, by which the *Chile* is gently diſpatch into its *Duct*; and when the *Diaphragm* leaves off, theſe *Abdominal Muſcles* begin, by looſning it, and bringing it into an *Arch*, upon which the Belly becomes lank by the Contraction of theſe *Muſcles*, they forcing the *Stomach* inwards and upwards.

Annotat.

In *Fabrit. Hildan. Obſ.* 39. Cent. 2. We read of a Man about forty Years of Age, being troubled with a great pain of his right ſide, reaching even to his Spurious Ribs, without any apparent Intemperiety, ſave only an hardneſs that was found between the *Abdominal Muſcles*, being deeply ſeated there, and by its continued pain, it gave a ſufficient reaſon to ſuſpect an Abſceſs there ariſing, which ought to be laid open; which being carefully done, the

Hiſtory.

matter flew out plentifully, and the Symptoms abated, and the Patient happily diſmiſt from his Pains, with a perfect Recovery.

This you have at Tab. II, *with its Semilunary Line, and at* Tab. IV, *you have the ſame laid bare.*

Rectus Abdominis, or the *Right Muſcle of the Lower Belly.*

This brings the *Belly* forwards.

THIS pair of *Muſcles* being covered with right Fibres, well and ſtrongly made, and ſufficiently lined with Fleſh, have their Names given them from their Rectitude of Fibres; this ariſeth from the *Os Pubis*, and running along the length of the lower Belly, from the *Enſiformal Cartilage*, is inſerted into the ſides of the *Sternon,* where the laſt true Ribs have their Cartilages: Its Inſertions are various, it ſometimes ſhewing three, ſometimes four, and ſometimes three and a half, which ſometimes appear above, and at other times ſeen below: The *Paragraphs* of this *Muſcle* are alſo very obſervable, for where you find four *Paragraphs*, you will ſcarce meet any *Pyramidals*. Some *Authors* write, that theſe bring the *Penis* from the *Ribs*, and that they ſeem to ſwell when we riſe out of our beds, and fill outwards; others ſay they help towards the bringing the *Trunk* inwards, and that by their double Contractions, they bring the *Breſt* to the *Os Pubis*, and the *Os Pubis* to the *Breſt*.

Obſervat.

Annotat.

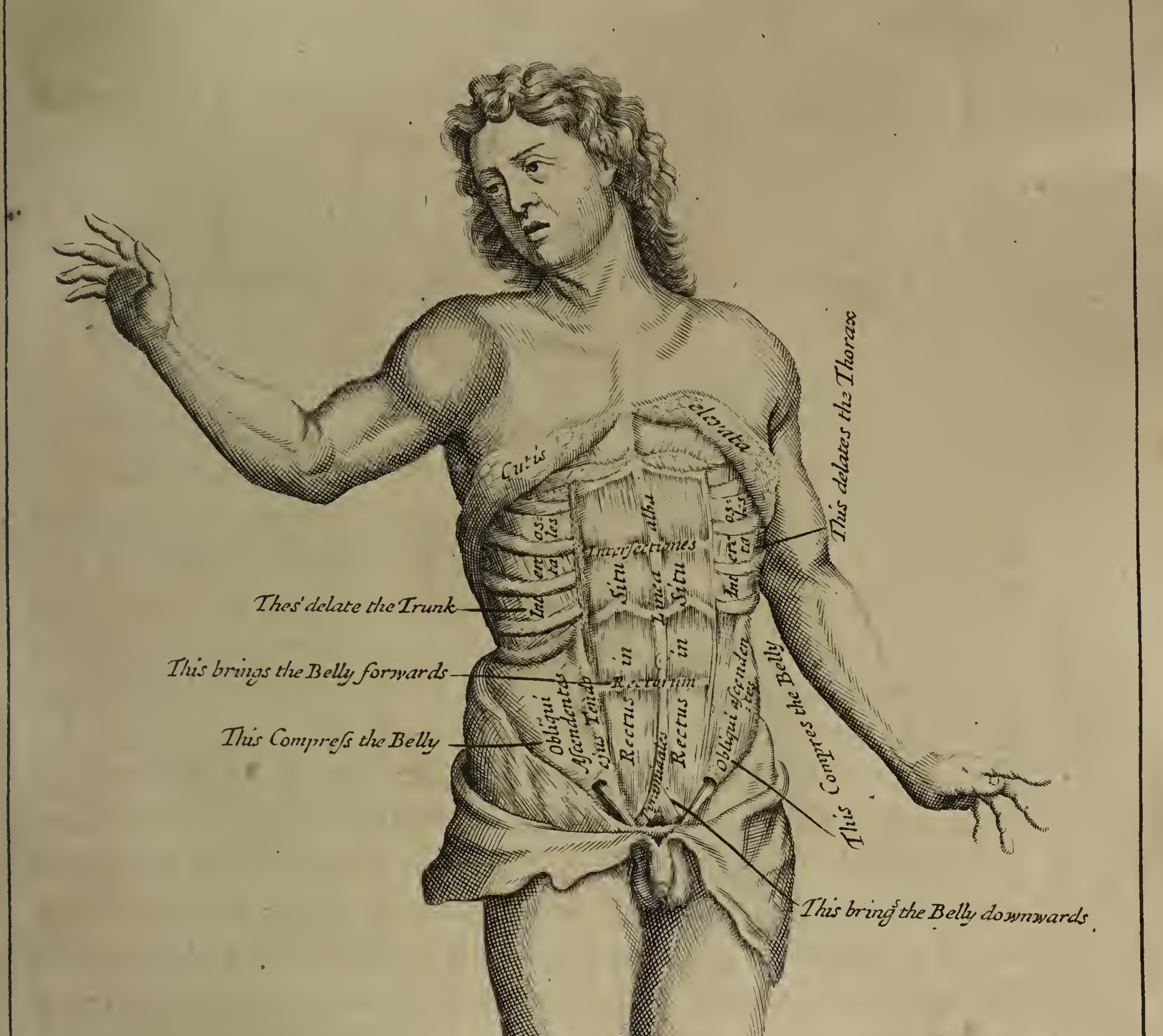
Again, as they take their Originations from the *Os Pubis*, and the *Sternon*, and inſert themſelves into the *Linea Alba*, marching all along lengthways, through the middle of the *Abdomen*, by their Contractions they are ſaid to bring their Inſertions inwards, by which motion, they are allowed alſo to promote the *Periſtaltick* motion of the *Guts*, in their diſcharge of the groſſer part of the *Excrement*.

Again, as they march along in ſtraight lines, and the *Oblique Deſcendent* in Bevil lines, and the *Oblique Aſcendent* in Oblique Aſcendent lines upwards, and the *Tranſverſe* croſſing the Belly, towards the *Flanks*; all theſe being cloſely put together, do make a warm Covering for the *Bowels* lodg'd within its Dimenſions.

Obſervat.

And as a very uſeful Obſervation to all Students in *Anatomy* and *Surgery*, the *Fibres* of theſe *Muſcles*, are to be always had in

TAB III



Cutis
elevata
This delates the Thorax
Inter
coſ
tales
Interſectiones
Linea
alba
Situ
in
Situ
Inter
coſ
tales
Theſ delate the Trunk
This brings the Belly forwards
Rectorum
Obliqui
Aſcendentes
ejus Tendo
Rectus
in
Rectus
in
Pyramidales
Obliqui aſcenden
tes
This Compreſs the Belly
This Compres the Belly
This brings the Belly downwards

remembrance, when ever any *Abſceſs* ſhall happen in theſe parts; for he that ſhall make any Inciſions in theſe Parts, contrary to their Fibres, will not only divide them, but weaken the *Muſcles* ever after; and he, who ever he be, that ſhall open an *Abſceſs*, hapning in this Right *Muſcle*, with an *Oblique Inciſion*, muſt neceſſarily divide its Fibres, as well as he that makes a direct Inciſion into any of the *Oblique Muſcles*; and he that opens the *Tranſverſe Muſcles* with an *Oblique Inciſion*, muſt neceſſarily cut their *Fibres*, as *much* as he that opens the *Pyramidals* when he cuts them Tranſverſly.

This you have at Tab. III, *and at* Tab V. *you have the ſame laid bare.*

Tranſverſus Abdominis, or the *Abdominal Tranſverſe Muſcle.*

This brings the *Belly downwards.*

THIS Pair takes their Names from their Situations lodging under the former, and are penetrated above with the *Cremaſteres*, and are allowed a three-fold Origination; firſt, Fleſhy, from the inner Extremities of the Baſtard Ribs; ſecondly, Membranous, from the *Tranſverſe Proceſſes* of the *Loins*; and laſtly, from the *Spine* of the *Os Ileon*, inſerting themſelves with a Membranous Expanſion into the *Linea Alba*, which is a Contexture made up, and interwoven out of all the *Tendons* of the *Abdominal Muſcles*, which being run together into one entire Body, do very much aſſiſt each others Motion in compreſſing the *Belly.*

Obſervat.

Bartholine writes, That this was made for compreſſing the *Colon*: Moſt *Anatomiſts* allow, that this Pair of *Muſcles* do bring the Belly inwards, they being of much Uſe in their Contractions, and by being alſo of a moderate Thickneſs, do aſſiſt the former in keeping the Bowels warm, which are lodged under them.

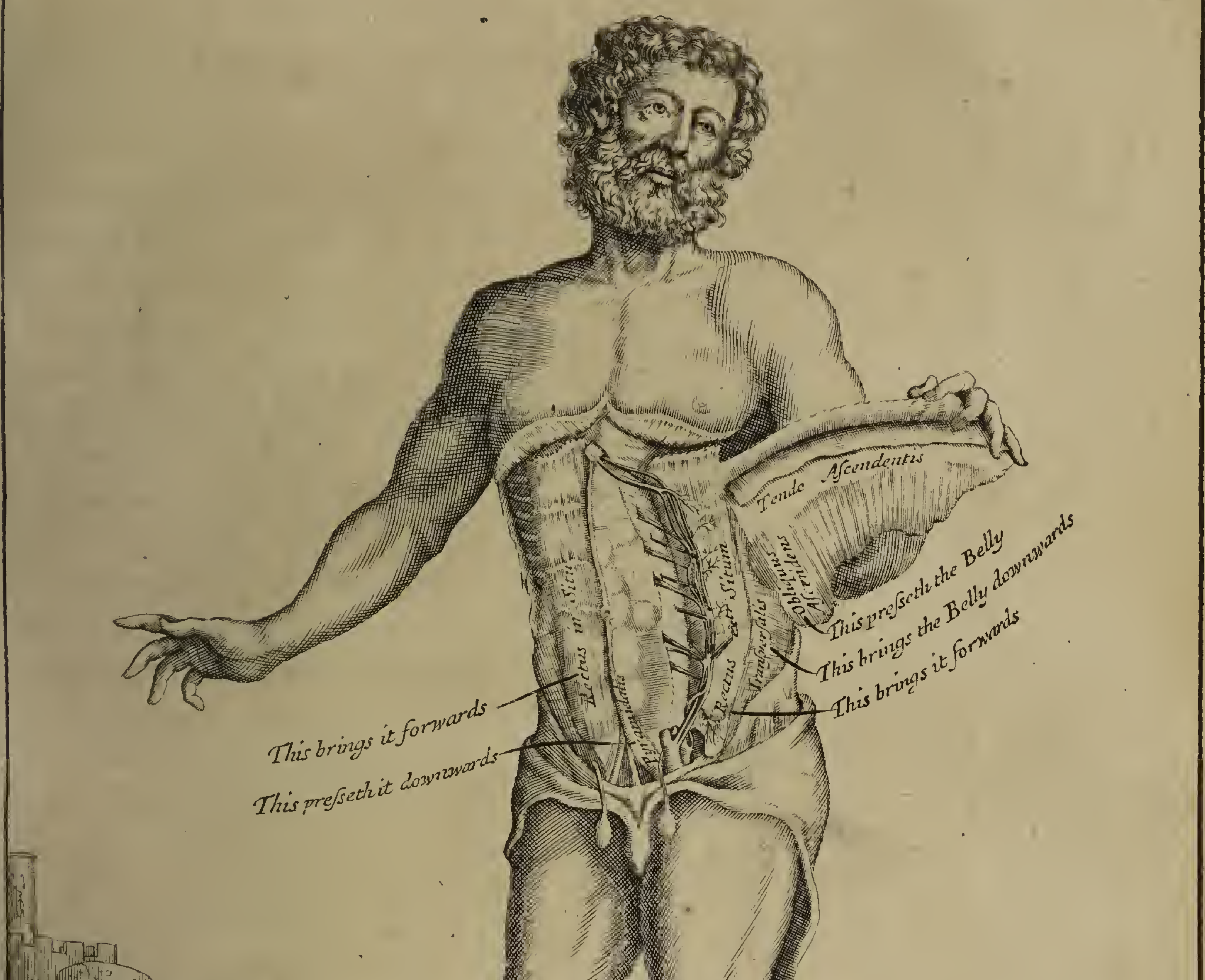
Annotat.

This Muſcle alſo being perforated above the *Oblique Aſcending Muſcle*, through which the *Cremaſters* and *Spermatick Veſſels* do paſs, and the Perforations of the *Oblique Deſcending*, and *Oblique Aſcending Muſcles* of the *Abdomen* being thus framed and planted one above another, not in ſtraight, but in Bevil Lines, running and croſſing the Belly, do hinder the *Prolapſion* of the *Inteſtines* into the *Scrotum*; for by their Fibres running-counter to thoſe of the *Right Muſcles*, and croſſing each other, they are plainly ſeen to bind the *Guts* in their proper places, as the Fibres of theſe *Tranſverſe Muſcles* running o'rethwart, do the ſame in their right *Angles* ſecuring them laterally.

Obſervat. Chyr. As for the uſual Accidents which generally happen in theſe parts, I find none more dangerous than Mortification, which is evermore accompanyed with Pain, Fever, Strangulation, and ſometimes the Iliacal Paſſion, where the Excrements are often forced againſt their own weight to mount upwards, and ſeen to come towards the mouth; the Cauſe of which cruel Symptome proceeds from the *Guts*, being inflamed by the Excrements therein lodged, which it communicates by inflaming the Ends of the *Muſcles*, eſpecially arriving at this of the external *Oblique Muſcle*, which by reaſon of its Tendinous Frame, fails not to ſhut up the Gut, and augment the Inflammation by a reciprocal Action, which cauſeth Interruption of the Courſe of the Blood and Spirits in that part, from whence comes the Reflux of the Excrements, Blewneſs and Mortification, which may eaſily follow from the Loſs of their Motion, from whence can enſue nothing but Divulſion, Pain, and Loſs of Life. There's yet another Lividity, which many times is ſeen to ariſe from too hard Preſſure of theſe *Abdominal Muſcles*, frequently cauſed by handling the Belly too much, and too hard, and rough, as is often ſeen done, in endeavouring to bring the Stone down to the Neck of the Bladder, which unprofitable, as well as unneceſſary Tryals, are oft-times the Occaſions of many Bruiſes, imprinted on the inward Parts, as the *Guts*, the *Kell*, &c. in which the Blood many times ſtagnates in the Veſſels, and thence is ſeen to ariſe an immediate Mortification, and Change of Colour. The Chyrurgeon therefore being here cautioned of theſe bad Symptomes, ſhould make it his Buſineſs, as much as in him lay, to prevent them; or wherever he be ſent to any where, he has all theſe appear to him, he ought rather to retire, than undertake ſuch a Patient, leſt he brings his Reputation into no ſmall Danger.

This you have at Tab. V. *both in and out of its place, with the* Peritonæum.

TAB: IV.


Tendo Aſcendentis
Rectus in Situ
Pyramidalis
Rectus extra Situm
Transverſalis
Obliquus Aſcendens
This preſseth the Belly
This brings the Belly downwards
This brings it forwards
This brings it forwards
This preſseth it downwards

Pyramidalis, or the *Pyramidal Muſcles.*

This preſſeth the *Belly* downwards.

FALLOPPIUS, the firſt Inventer of theſe *Muſcles*, gives them theſe two Names, *Pyramidalis* from its make, it being faſhion'd like a *Pyramid*, with a broad Baſis, and a narrow Point, and *Succenturiatus*, it being as an Aſſiſtant to the *Oblique Aſcendents*, helping them in their Motions; it ariſeth Fleſhy and broad, and narrowing its ſelf by degrees, it becomes a long Tendon, Implanting its ſelf into the *Navel*, or ſometimes above, or beneath it to the *Linea Alba*.

Theſe are often ſeen wanting in thoſe who have the Origination of their *Aſcending Muſcles*, not from the *Ileon*, but from the *Strong Ligament*, which paſſeth inwards from the *Spine* of the *Os Pubis*, and hath four Pharagraphs in the *Right Muſcles*; 'tis commonly obſervable, that the left of them is uſually the leaſt.

Uſe.

The *Inventer* of them ſays they were deſign'd for compreſſing the *Bladder*, and promoting the diſcharge of the Urine.

Columbus writes that they aſſiſt in raiſing the *Penis*, but *Fludd* confutes this Opinion from their Situation; for they do not reach it, and therefore cannot reaſonably be ſuppos'd to help that part, with which they have no Correſpondence; another Reaſon is, they are alſo found in Women.

Annotat.

Nature has ſhewn her ſelf a very induſtrious, as well as a curious Miſtreſs, in thus variouſly planting theſe *Muſcles* over the Belly, for the better keeping the inward parts in their proper Encloſures; and by theſe their ſubſtantial fleſhy Expanſions, defending them from Cold, and outward Injuries, in Arching ſome of them, and running others into right Lines, and allowing theſe a *Pyramidal Figure*.

This you have at Tab. III, *and* Tab. IV. *in its proper place, and the ſame laid bare at* Tab. V.

Cremaſteres, or *Suſpenſorii*, or *thoſe* Muſcles *which keep up the* Teſticles.

This keeps up the *Teſticles*.

EACH *Teſticle* is furniſhed with a proper *Muſcle*, which has the Name of *Cremaſter*, from κρεμάω *Suſpendo*, given it from its Uſe of keeping up the *Teſticles*; as *De Graaf*, and other

Anatomiſts write: It is tyed to the outward Membrane of the *Vaginal Coat*, on either ſide: In Man, it has its Origination from a *Ligament* belonging to the *Os Pubis*; but in Dogs, and other Creatures, their Beginnings are ſeen to ariſe from the *Tendons* of the *Tranſverſe Muſcles*, with ſomewhat of Obſcurity, whoſe fleſhy Fibres are ſeen to march the whole Length of the *Vaginal Coat*, eſpecially in its back part; for which reaſon, its outward Coat appears aſperate and fibrous, whilſt its inward (which reſpects the *Teſticle* and its *Veſſels*) is light, and bedewed with a wateriſh Moiſture, as *De Graaf* writes, and is ſtrongly annexed to the lower parts of the *Teſticles*.

Uſe. The Uſe of this Coat is threefold; Firſt, that the *Teſticles* in cold weather may be nouriſhed and cheriſhed by theſe their Coverings; Secondly, to keep them up, leſt being at any time over loaded, their weight might make them fall down, and hereby hinder the *Spermatick Veſſels* in their Operations, as have ſome times been ſeen in the Act of *Venery*: And

Bartholine tells us, of one who had this *Muſcle* ſo ſtrong, that by the Strength of its carnous Fibres, he could move his *Teſticles* either way as he pleaſed; as ſome are ſeen to move their *Scrotums*, and others their *Fronts*, by the Uſe of the Muſcular Fibres, lodged under the Skin thereof.

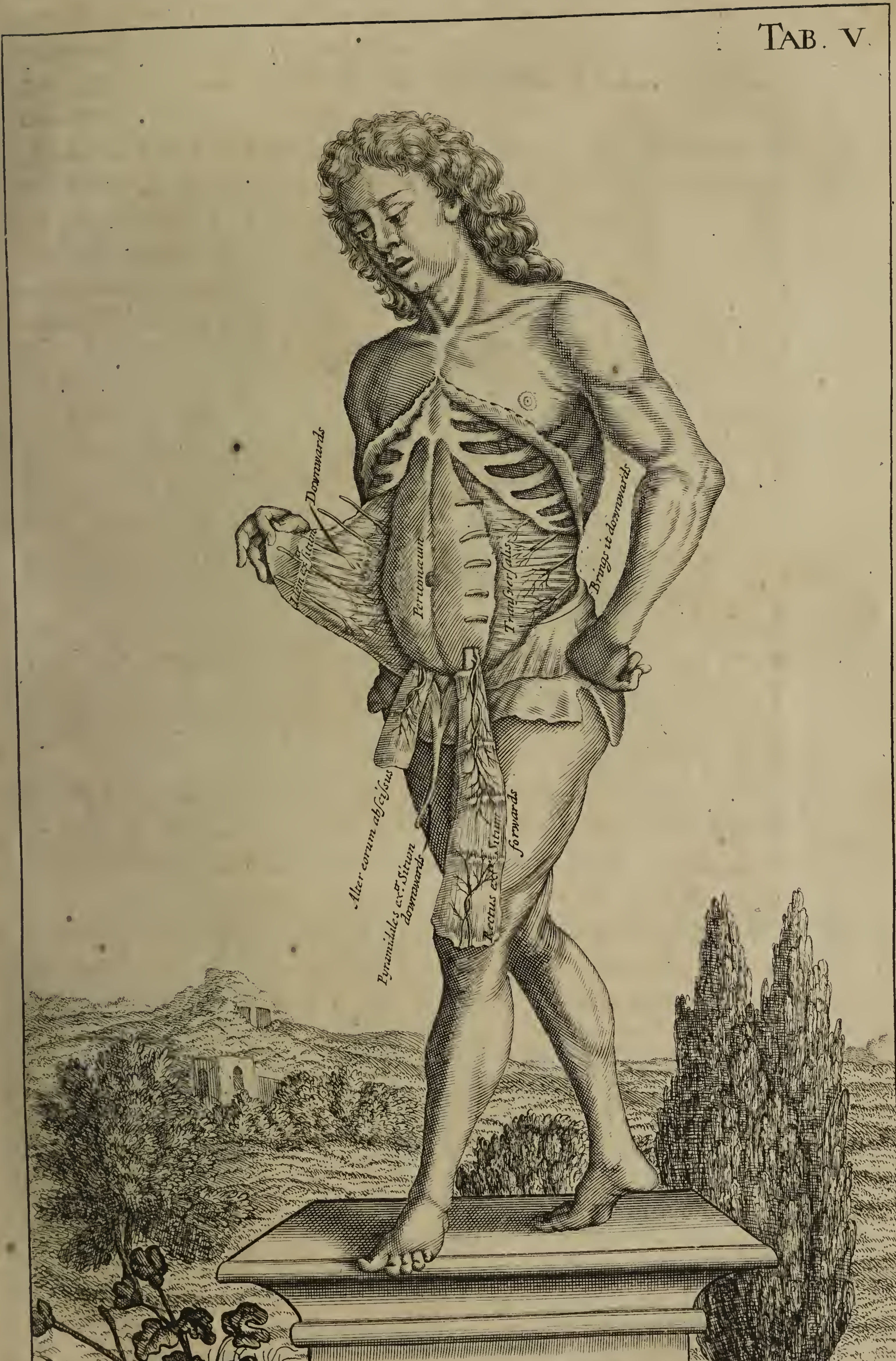
Hiſtories. *Bartholomeus Cabrolius*, Obſ. 3. writes of one without *Teſticles*. *Riolan* in *Anthropograph.* Lib. 11. Cap. 31. writes of a Young Man, of 25 Years of Age, who, when he publickly diſſected in the Schools, ſhew'd a Body with one *Teſticle*.

De Graaf writes, in his Book *de Org. Vir.* That he diſſected a Man with one Stone, without any *Cicatrice* in the *Inguen* or *Scrotum*; and tho' his Wife had four Children by him, yet being askt whether her Husband had ever two Stones, ſhe told him he never had more than one.

Some, on the contrary, have had three Stones, and this has run ſo in many Families, and theſe are generally allowed Maſters of great Letchery. And there are ſome *Anatomiſts*, that write, that in the *Illuſtrious* Family of the *Colings*, many have had three Stones. *Fernelius* and *Foreſtus* have many ſuch like Obſervations; among which, he tells you of one at *Antwerp*, who had three Stones, and was taken Notice of for being a very laſcivious man.

This you have at Tab. VI. Fig. III.

TAB. V.


Downwards
Idem ex ſitu
Peritonæum
Tranſverſalis
Brings it downwards
Alter eorum abſciſſus
Pyramidales extr. Situm downwards
Rectus extr. Situm forwards

Dartos, or *Corium*.

This contracts the *Scrotum*.

IT hath this Name of *Dartos* by *Celſus*, ἀ δέρας *Corium*, or rather ἀ δέρω δέδαρται, one of the four Skins, covering the *Teſticles*; The *Scrotum* being nothing elſe, but one Skin covered with another, the inner thereof is ſeen to be made up of a *Fleſhy Panicle*, being thinner than the other: It takes its Origination from the *Membrana Carnoſa*, it being a *Muſcular Membrane*, furniſh'd and repleniſh'd with many carnous Fibres; by the help of which, its neighbouring Coat is ſeen to contract and purſe up its ſelf, and by the Contraction of both, they do narrow and bring in the dilated Dimenſions of the firſt Coat of the *Scrotum*; there are thoſe who have been ſeen to have theſe ſo ſtrong, that they could take in, and let out their *Cods* at their pleaſure, as ſome are ſeen to make their Foreheads contract, by the Strength of the Fibres of the *Muſcles* lodged under them.

Annotat.

The Coats inveſting the *Teſticles*, are allowed to be either common or proper, by *Regnerus de Graaf*. The firſt of which we commonly call the *Burſa*, or the *Bag*, from whence its generally ſuppoſed, the reſt of the Coats do take their Names of the *Scrotum*; this being made purely of a *Cuticula* and *Cutis*, being here much thinner than that of any other part of the Body; its clear'd of Fat, to prevent its Extenſion, which would be no ſmall Hindrance to it in progreſſive Motion.

Obſervat.

This its ſecond Coat, helps the firſt in making its Contractions, and runs it into Folds and diverſe Wrinkles, as we may ſee when it is expoſed to the Air, or hath been in the Water; which cauſing theſe its Fibres to contract themſelves, do at the ſame time ſhrivel up the *Cod*, and leſſen its Dimenſions.

Hiſtory.

Obſ. 57: *Fabrit. Hildan.* We read of one about 40 Years of Age, who was troubled with the *Strangury*, &c. which painful Fits were ſeveral times repeated in few Years, with Pains in his Belly; ſometime after, his Water left coming through his *Penis*, but now and then forc'd it ſelf through his *Cod*, and through the *Region* of his *Pubis*, where it made many fiſtulous Ulcers for its Diſcharge, and through which he ever afterwards let out his Urine, without any Pain or Trouble; and as ſome of theſe ſmall Ulcers ſeemed to dry up, new ones grew in their room; after this, a new large *Abſceſs* was ſeen to ariſe in the left ſide of his *Scrotum*: He coming to *Baſile* in very great pain, ſoon after, it broke, whence iſſued much Matter, and after which, a Stone appeared to view; which being Extracted, weighed at firſt above an Ounce; but being dry'd, it afterwards weighed leſs than five Drachms; the Stone was porous, and of a Cineritious Colour, not much irreſembling a *Pumice-ſtone*, dipt in the water; yet this Man received ſo good a Cure, that he could retain his Urine (notwithſtanding his former Ulcers) with out any involuntary throwing out of the ſame.

This is not to be ſhewn by any Figure.

Muſculi Clitoridis, or the *Muſcles* of a *Glandiform Corpuſcle*.

This extends the *Clitoris*.

THE *Clitoris* comes from an obſcene Word, κλεῖτοριαζεῖν *Fricare*, or *Contrect*, or *Tickle*, or *Handle*: It being a ſmall round body, fram'd of Nervous, and ſpongy Parts, ariſing out of the upper parts of the *Os Iſchium*, as out of two *Crura*, or *Thighs*, meeting at the *Commiſſure* of the *Share Bone*: It having various Names given it by Authors; *Hippocrates* calling it *Columella*, from its likeneſs to the *Uvala's* hanging down; *Avicen* calls it *Virga Muliebris*, which ſome Women have made uſe of as their natural *Penis*; *Bauhine* names it *Venus's Darling*; *Columbus*, and others call it, *the Place of Love and Pleaſure*: And if among theſe, I preſume to call it *Natures Tricker*, I ſhall not ſuppoſe my ſelf much in the wrong; in that, (like that of a Gun) when ever this part is rais'd, or ſwell'd up by the warmth of *Womens Embraces*, (like a flaſh in the pan) it readily raiſes their Letchery by a cloſe perfrication of this part, in the time of Coition, in which it willingly receives the ſtrutting *Penis*, with its elaborated Blood and Spirits, into the moſt amorous Chambers of their natural delight; and were it not that theſe Parts were abſolutely endew'd with ſo exquiſite a ſence of Delight and Love, in their venereal Embraces, there is no Woman would undergoe the burden of a nine Months Travel, and at the end of that, the cruel Pains of the diſcharge of the *Fœtus*, were it not but now and then in the midſt of her troubled thoughts, She entertains and refreſhes her ſelf, with the reiterated Motions, and kind Embraces of thoſe who firſt occaſion'd theſe her lively Pains.

Various indeed are allowed the Dimenſions of this part, it being plainly more apparent in ſome Women, than in others: Hence *Regnerus de Graaf* aſſures us, that in an extraordinary Looſe of Nature, he hath obſerved in middle aged Women, the *Clitoris* to hang down like an *Internode* of a Finger, and without the Deduction of the Lips of the *Matrix*, it has been apparently ſeen with the Divarication of its *Muſcles*: *Plazzonus* writes, he ſaw the outward part of the *Clitoris* produced into that bigneſs, which equall'd the length of four Fingers: And *Platerus*, in his Obſ. Lib. 3. writes, he ſaw one in a Woman that equall'd a *Gooſes Neck*, both in length and thickneſs; and *Plempius* relates of one *Helena*, who exerciſed this part with many Women, and had corrupted ſeveral Virgins therewith; and *Diemerbroeck* ſays, he once ſaw in a Woman at *Montferet*, that was a *Beadles Wiſe*, who had a *Clitoris* the length and thickneſs of a moderate *Penis*: And tho' the ſame Author writes, that the *Clitoris* in Women does very well anſwer the *Penis* in Man, both in its Situation and Subſtance, and only differs from it in length; yet reaſon will not allow this, in that its *Glans* is no ways perforated, nor has it any Paſſage into the *Urethra*, as has that of the *Penis*.

The *Muſcles* aſſign'd this, do ariſe out of the Bones of the *Coxendix*, which paſſing over its *Crura*, are thereinto inſerted, and are allowed by their Contractions to compreſs them; and by this their Compreſſion, are ſaid to give a Check to the Motion of the Blood, upon their diſtending the Body of the *Clitoris*. *Regnerus de Graaf* allows it a ſecond Pair of *Muſcles* ariſing backwards from the *Sphincter Ani*, and are faſtned thereto, that they may rather be allowed to contract the *Orifice* of the *Vagina*, than procure any Erection of the *Clitoris*.

Hiſtories.

Diemerbroeck writes, in Fol. 152, Anat. Lib. 1. that he ſaw a Man at *Anjau* in *France*, of 28 years of Age, with a large Beard, cloathed in Womens Habit, who, for many years travelled up and down to ſhew his Privities for Money; in whoſe upper part of the *Pudendum*, a *Clitoris* ſtrutted out the length of a middle Finger, and the thickneſs of a moderate *Penis*, with a *Glans*, *Præpuce*, and *Frænum* joyn'd to it, as is uſual in Man; ſave that it was wholly imperforated, under the *Urinary Paſſage*; and the *Vagina Uteri* ſhew its ſelf as in other Women, and in either Lip of her *Matrix*, was a *Teſticle* contained.

And in the Year 1668, he writes, he ſaw an *Engliſh Hermaphrodite* of twenty two Years of Age, who, among many other Shows, came to *Utrecht*, whoſe *Prolocutor* or *Informer*, proclaimed that he was born a *Girl*, and in the 5th. and 6th. Years of his Age, his *Genitals* began to change, and in the 11th. year thereof, the *Penis* ſhew its ſelf, and was afterwards ſeen to ſwell near half the Length of the Little Finger, without any apparent Perforation in the *Glans*, altho' it was not much unlike it in Shew: This *Penis* upon her letcherous Thoughts, was ſeen to extend a Fingers length, and in each *Lip* of her *Womb*, was lodged a *Teſticle*, as in the *Scrotum*; and a little underneath it, in its due Place, was ſeen the *Urinary Paſſage*, and the *Vagina Uteri*: Her *Interpreter* told them, that ſhe had her *Menſtrues* monthly, as other Women uſually have; and that in the Height of her Letchery, ſhe uſually caſt her Seed outwards; but whether this came from her *Penis*, or her *Matrix*, he could not, nor was not able to ſay: Whence it is ſufficiently apparent, that theſe ſorts of *Hermaphrodites* are not parts of either Sex, but rather to be accounted Women formed with Genitals of an uncommon Conformation, when we ſhall ſee in them their *Teſticles* hanging out of the Lips of the *Abdomen*, and the *Clitoris* ſo enlarged and encreaſed, as to run into thoſe various lengths and thickneſſes we have here ſhewn them to be deſcribed by Authors.

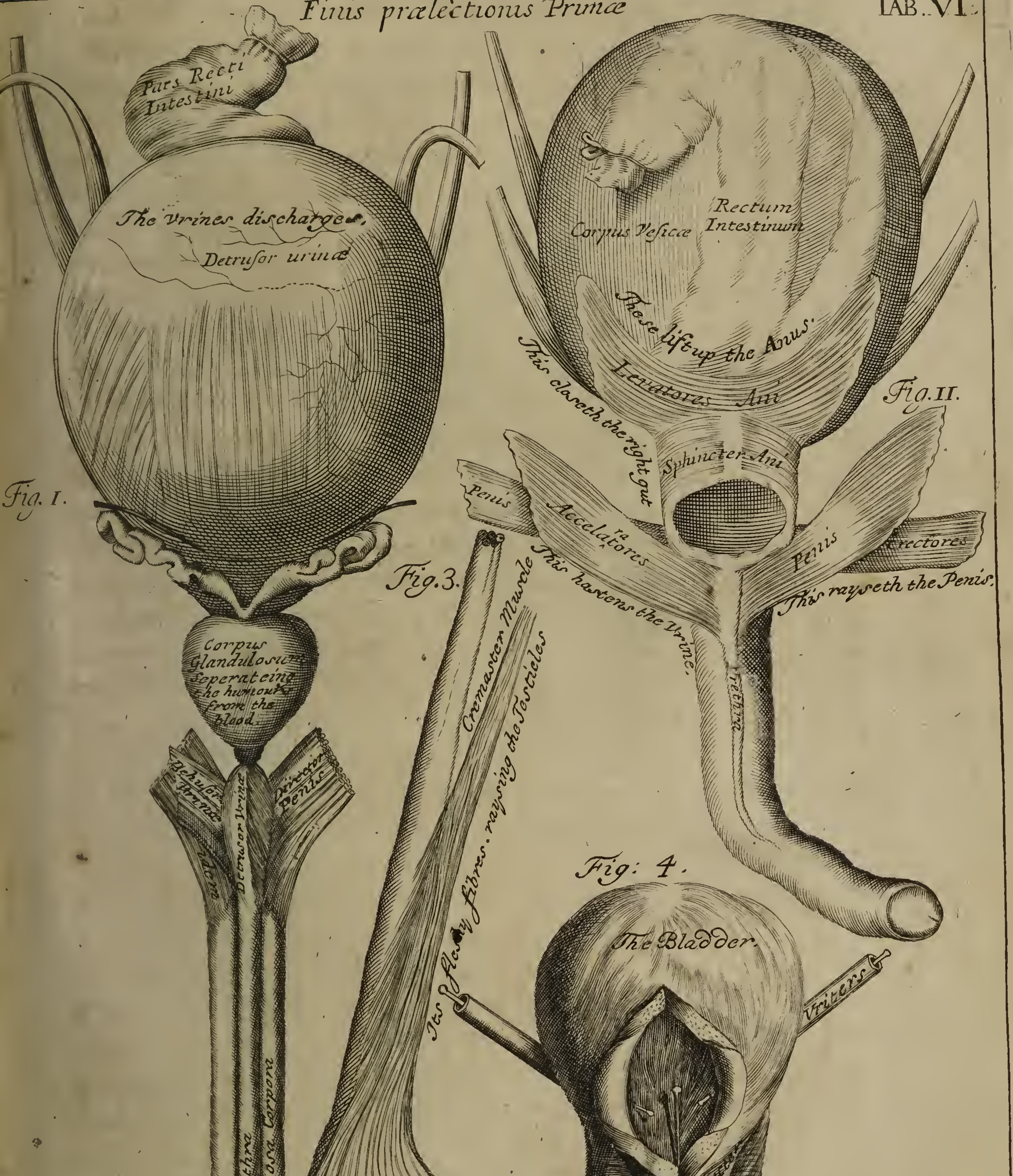
This you have at Tab. VI. Fig. IV.

Director Penis, or *Collateralis*, or the *Yards Erecter* or *Collateral Promoter*.

THE *Penis* hath its Name *à Pendendo*, and ſometimes it is called *Mentula*; it oft-times bearding a Man, or plucking by the *Chin*, from his more ſerious buſineſs, to venereous Embraces: And *Collateralis* by *Spigelius*, from its Collateral order of Fibres. Now of what Eſteem and Veneration this Inſtrument was amongſt the *Ægyptians*, *Riolan* in his *Anthropolog*. Lib. 11*th*. Chap. 3. has ſhewn. Its planted in the lower Belly, as the fitteſt place, for exerciſing its faculties; and as to its largneſs, or ſmalneſs, its uſually ſeen greater in thoſe who make more frequent uſe of it, than in thoſe whoſe care is otherwiſe employ'd: Amongſt its other parts, it is allow'd two pair of *Muſcles*; one of which are theſe, by *Spigelius* commonly call'd *Collaterales*, and by others call'd *Directores*, or *Erectores Penis*, they taking their Originations

Finis prælectionis Primæ

TAB. VI.



ſrom the *Appendix* of the *Coxendix* under the beginning of their Nervous Bodies, in whoſe thick Membrane their Fibres do ſeem to terminate and diſappear.

And whereas theſe *Muſcles* are allowed to be *Erectors* by moſt *Anatomiſts*, yet whoever really conſiders their Situation, muſt reaſonably conclude, that they rather depreſs than raiſe the *Penis*; for if here, as in all other *Muſcles*, their Bellies are ſeen to ſwell, and their Terminations come cloſer, or nearer to each others, while they are in Action, (which if granted) then it muſt neceſſarily follow, that the *Penis* cannot be diſtended, when theſe *Muſcles* are contracted, or ſet to work; nothing being more wide, than Extenſion is from Contraction: Nor indeed, can theſe *Muſcles* any wiſe raiſe the *Penis*, conſidering their Situation; for whereas their Origination is firmly affixt to the Bones of the *Coxendix*, as I formerly ſaid, and cannot thence be moved, as being altogether immoveable, ſo it is neceſſary, that one of the Extremities ſhould be attracted to that part, to which the *Penis* is annex'd; and therefore plain reaſon ſhews, that the *Penis* muſt rather herein be depreſt, than erected, even from their Originations, which are generally allowed to ariſe in the lower part under the *Penis*. Obſervat.

But that we may deſcribe the true Uſe of theſe *Muſcles*, according to *de Graaf*, we with him muſt grant, that the *Penis* hath all ſorts of Veſſels allowed it, ſome of which are ſent to its extream parts, ariſing from the *Pudendum*, running over the thick Membrane of the nervous Bodies, others marching and entring their inward ſpongy Subſtance: The Nerves running over the thick Membrane of its nervous Bodies, are two Nerves ariſing from the *Os Sacrum*, and as many Nerves and Arteries coming from the *Hypogaſtricks*, which every way ſending forth their Capillary Branches, are ſeen to terminate and run into the *Glans*, before they obſcure themſelves. Having thus toucht upon the Veſſels allowed the *Penis*, it will be neceſſary to ſhew what Veſſels do go along with theſe *Muſcles*, in aſſiſting them to cauſe an *Erection* thereof; and here moſt certainly Nerves muſt be of the one part, ſending thither their Animal Spirits, and Arteries alſo, which afford it Blood ſufficient for cauſing a Diſtention in the ſpongy part of the *Penis*, and without which, no Diſtention appears; and this is made good, by pouring or injecting Water with a Syringe into thoſe Arteries of the Deceas'd which lead to theſe nervous

Bodies, whereby you may eaſily ſee the *Penis* become diſtended: Again, as *de Graaf* ingenuouſly obſerves, whenever you tye the *Penis* of a Dog in the time of Coition, you will ſcarce find upon opening of it, any thing elſe but fluid Blood come out from thence, which when diſcharged, his *Penis* ſhrivels immediately up: But as to our preſent Subject, if it may be enquired, how the *Penis* is erected in the Action of theſe Muſcles, as it naturally and reaſonably ſeems it ſhould, if they do rather retract or draw the *Penis* downwards, as we have already ſaid, rather than raiſe it; this may ſerve for an Anſwer, that this does not immediately happen from the *Muſcles*, or any Advantage ariſing thence, but rather mediately, as the *Muſcles* of the *Penis* in ſtraitning theſe nervous Bodies near their Originations, do hereby propel, and drive forwards the Blood towards the forepart of the *Penis*, and by making here a Diſtention of their Bodies, they encreaſe its Erection, as we may plainly ſee in the parts of the *Inteſtines* which we diſtend, either with Wind or Water; where, if one end be compreſt, the other readily becomes erected and diſtended; out of all which, we with *de Graaf*, may offer at three things, which may advance the Erection of the *Penis*; firſt, by preſcribing ſuch things as can augment the Animal Spirits; ſecondly, by adviſing that which can allow an Encreaſe to the Quantity of Blood; and laſtly, by ſtrengthning the *Muſcles*, by whoſe Conſtriction the Blood is allowed to be detained in theſe the nervous Bodies.

Hiſtories. Obſ. 19. *Borell:* Med. You read of a dead Body being opened, whereupon examining the lower parts, the *Scrotum* was found a ſmall Diſtance from the *Anus*, and as it were joyned to it; in theſe were two *Teſticles* found; above his *Cod* appeared a certain fleſhy Subſtance, covered over with a *Cuticula* and *Cutis*, which gave ſome ſhew of a *Penis* cut through its length in the middle, without any appearance of an *Urethra*; its Root was hard, ſolid, and almoſt cartilaginous, and in this its Roots, the Ejaculatory Veſſels were lodged; a little above this, a Fragment of a *Penis* ſhew its ſelf the length of the lower Belly; in the midſt of this ſemicircular Fiſſure, there appeared a fleſhy and ſpongy Subſtance, the bigneſs of an Egg hanging outwards, firſt ariſing red, and then made livid, markt with round red Eminences; the *Ureters* did not terminate in the *Bladder*, becauſe he had none, but in the Fiſſure, and the Urine diſcharged its ſelf by its Orifices, and dropt out continually;

Above this Excreſcence was planted the *Navel*, fram'd with four ſorts of Veſſels, *&c.* that which in his caſe was moſt material, he had no *Bladder* nor *Penis*, &c.

Hiſtories.

Diemerbroeck tells us, Fol. 154. Lib. 1. Anat. of one whoſe *Penis* was Originally lodg'd in the *Belly*, (as the *Teſtes* have ſometimes been found in the *Inguen*, and hence ſome ignorant *Midwives*, (the *Penis* being lodg'd in a Cleft) have declar'd a Female to be Born, and was ſo Baptized; who afterward arriving to riper Age, and the obſcur'd *Penis* ſwelling in Letchery, made its way out of its narrow paſſage, whereby we may plainly ſee that theſe Men were not Women from the firſt, altho' judged ſo by ſilly ignorant Midwives.

In Obſ. *Schol. Med.* Obſ. 1. *Felix Platerus* tells us of a *Prieſt* who piſt out about 2000 Stones in the ſpace of two Years; it being very wonderful, that Nature ſhould be more careful in raiſing a *Querry* of ſtones in ſome Bodies, to tear down or over turn the *Natural Fabrick*, than were ever deſign'd others for raiſing it.

This you have at Tab. VI, Fig. I, II.

Acceleratores Urinæ, or the *Urines Stimulators.*

This haſtens the *Urine*.

BEſides the former, the Virile Member hath theſe two allowed it, which take their Names from their uſe made of them; they ariſing from the *Sphincter Ani*, and being joyn'd together by their Inſides, are ſeen to run out with an Oblique Ducture, under the outward part of its Channel, and are ſaid to terminate in the thick Membrane of the Nervous Bodies.

The uſe of theſe *Muſcles*, according to ſome *Anatomiſts*, as well as that of the former, is contrary to Sence and Reaſon; for theſe are rather ſeen to narrow, than dilate the *Urethra*, and therefore can by no means properly be call'd haſtners, but rather delayers of the Urines Exit; for they ſometimes have been ſeen to run over the middle of the *Urethra*, and ſtrongly ty'd to one another with the extremities of their Fibres, whilſt the other marching Obliquely over the *Urethra*, is ſeen to ſend its ſides to it Nervous Bodies, Embracing or Contracting it as it were, whence muſt conſequently follow, in theſe as in all other *Muſcles*, that as they ſwell in their Contractions, they cannot at the ſame time dilate the *Urethra*, while they themſelves are compreſſed.

The following Obſervation was ſent me by my Worthy Friend Dr. *Connor*, viz.

SIR,

IN looking over the Muſcles *of the* Penis, *it made me conſider how they are ſometimes ſtrangely ſhrunk and withered; of which I have at preſent a famous Example in an Officer, who is now my Patient; a ſtrong man about* 45 *Years of Age, and a Man much uſed to Women; his Yard, which he aſſur'd me formerly was full Eight Inches long, is now ſo Contracted, that it hardly ſtretches Three Inches and an half, and is grown very little in all its Dimenſions, and makes but a very contemptible Figure, by its being drawn into the* Os Pubis; *the reaſon of which I ſuppoſe, may ariſe from his makeing too much uſe of it, by which the ſpungy* Cells *of the* Corpora Nervoſa *become dry'd up, and cloſed, ſo that the Blood cannot make its paſſage into them, nor diſtend them, as it does in the Natural State of Erection.*

This you have at Tab. VI, *and* Tab. XIV. Fig. I, II.

Lecture

Lecture II.

To which theſe following MUSCLES do properly belong.

Frontalis,
Corrugator,
Occipitalis,
Orbicularis clauſor,
Elevator Palpebræ,
Elevator
Dilatator } *Naſi Alarum,*
Conſtrictor
Zygomaticus,
Elevator } *Labii Superioris,*
Depreſſor
Elevator } *Labii Inferioris,*
Depreſſor
Sphincter Labiorum,
Buccinator,
Quadratus,
Elevator
Depreſſor } *Auriculæ,*
Abductor
Adductor

Temporalis,
Digaſtricus,
Maſſeter,
Pterygoideus Externus,
Pterygoideus Internus,
Styloceratohyoideus,
Coracohyoideus,
Milohyoideus,
Geniohyoideus,
Sternohyoideus,
Stylogloſſus,
Ceratogloſſus,
Geneiogloſſus,
Mylogloſſus,
Hypſilogloſſus,
Lingualis,
Maſtoideus,

Frontalis, or the *Frontal Muſcle.*

This draws the *Fore-head* upwards.

HAVING cleared the *Abdominal Muſcles*, which of neceſſity required our firſt uſe of the Kinife, we now arrive at thoſe which in Dignity deſerve our Inſpection, beginning with this *Frontal Muſcle*, which takes its Name from its Situation, it ariſing from the Elated Part of the *Front*, near the *Temporal Muſcle*, thin, broad and fleſhy, as alſo where the Carnous Membrane cloſely adheres to the *Cranium*; which made *Riolan* give it the Name of *Membrana Carnoſa Muſculoſa*, and in its march downwards, is Inſerted into that Skin which covereth the *Eyes*, as alſo into the *Eye-brows*.

Annotat. In raiſing this *Muſcle* from the *Cranium*, you'll meet with *Nerves* ſent from it: This being Elevated, it not only raiſeth the Skin of the Fore-head with it, but opens the Eyes alſo, and being made with right Fibres here, is a fair Caution to all Young Chyrurgeons how they make Inciſions in this Part.

Bartholine writes, that in a Naſute Perſon, he obſerv'd the *Appendix* hereof to be Extended even to the Cartilages of the *Noſe*.

Hiſtory. I begin this Second *Lecture* with an *Obſervation* of a Patient of mine formerly in St. *Thomas's Hoſpital*, who was an Old Woman of ſeventy three Years of Age, who by a fall Fractur'd her *Skull*, near the left ſide of the *Frontal Bone*; Mr. *Hollier*, and Mr. *James Molins*, who were both my Brother Surgeons with me in the ſaid *Hoſpitals*, being then call'd to view her with the Phyſitians alſo, who were Dr. *Dawkins* and Dr. *Briggs*; upon ſearching her Wound, we found a Fracture thro' both Tables; whereupon, the Wound being Dilated, we Extracted from her a piece of *Scull* the bigneſs of a Three pence, *&c.* And becauſe at that time I had the honour of *Monſieur De Blegny's* acquaintance, the *French Kings Surgeon*, and *Surgeon* of his *Hoſpitals*, who favour'd me with ſeveral Viſits at the *Hoſpital*, during his ſtay here in Town, which hapned while this Woman was my Patient, with ſeveral other deſperate Caſes then under my Cure in the ſaid *Hoſpital*, which he alſo ſaw; and making ſome Remarks, more particularly on her Caſe, with another of a Cancerous Ulcer, which had been of ſeveral Years ſtanding, reaching from the Calf of the left *Leg* to the *Heel*, did engage me, when ever I appear'd abroad in Print, that I would favour him with the Obſervations he then made and had writ on both their Caſes: The firſt whereof, I here preſent as I had it from him, and the other ſhall be put in its proper Place.

Obſervations Chyrurgicalles pour eſtre incerees dans le Journal de Medicine.

SI L'on en croit pluſpart des Authours, Il faut toujours faire un prognoſtic tres funeſte dans Les plaijes de Teſte, qui ſont avec Fracture du Crané; Cependant, il eſt certain, qu'on a veu bien des fois ces ſortes des plaijes, Venis à Cicatrice quoy que La Dure & la Pie Mere, & Meſme la propre Subſtance du Cerveau euſſent eſte conſiderablement

ſiderablement

TAB. VII.

Prælectio Secunda.

Fig. 1.

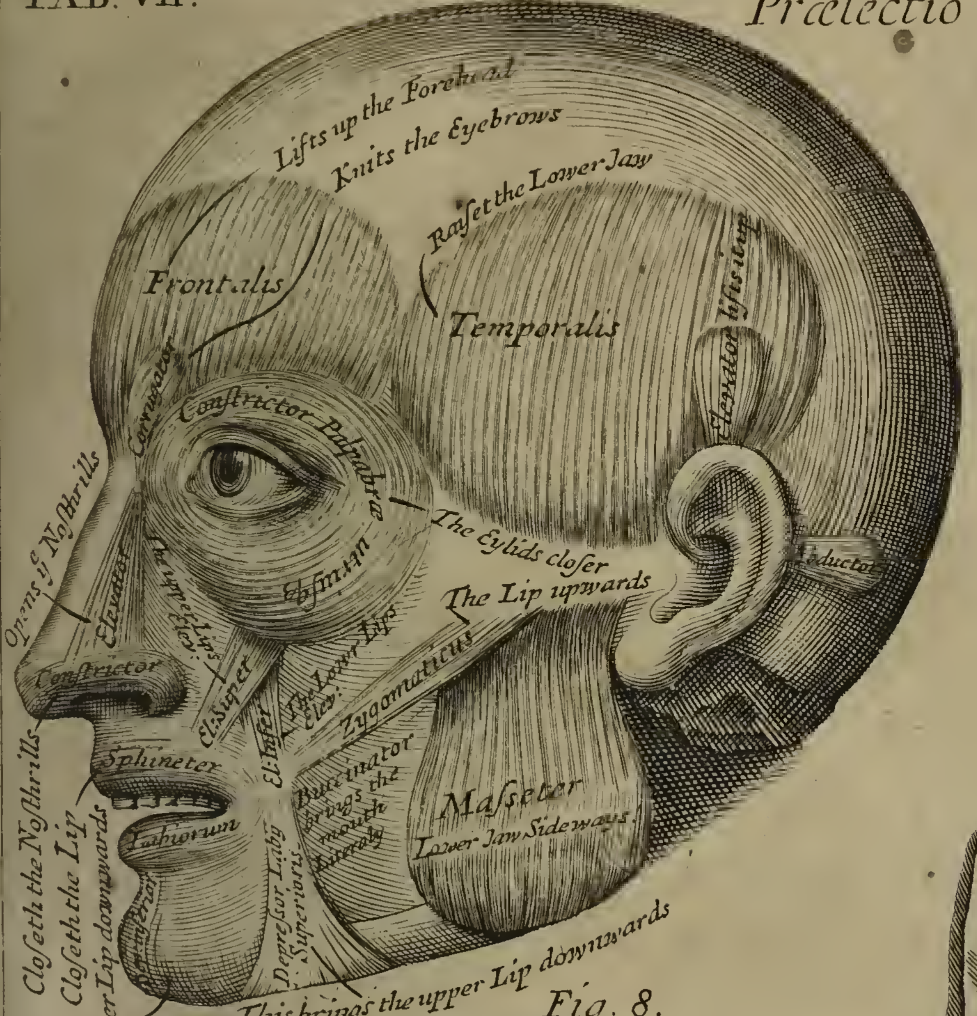


Fig. 6.

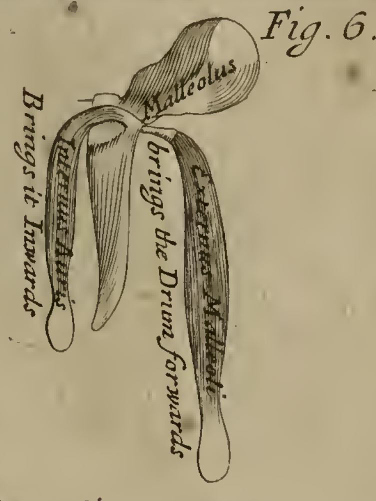


Fig. 5.

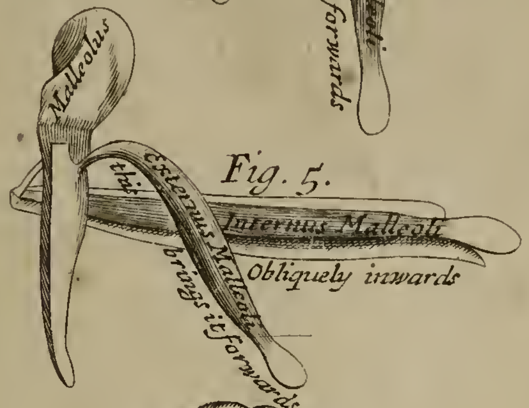


Fig. 4.

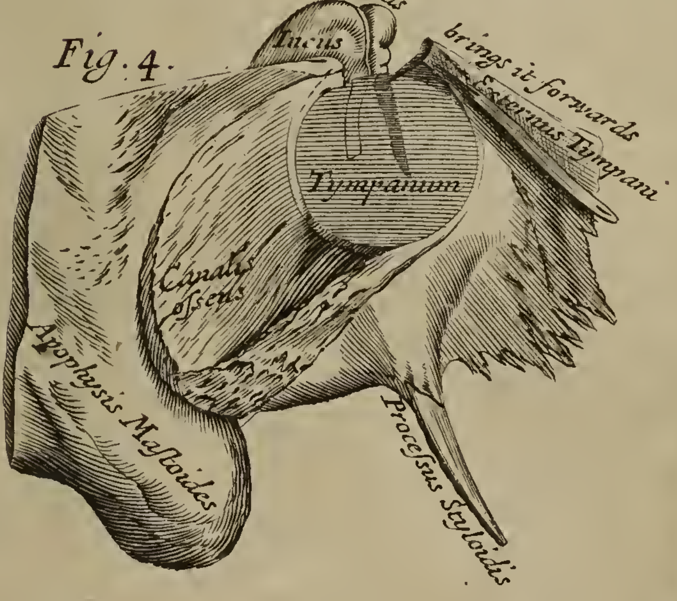


Fig. 8.

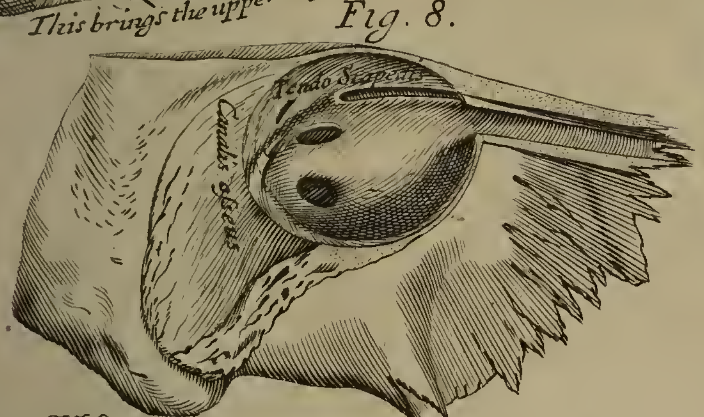


Fig. 7.

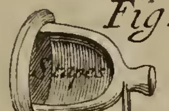


Fig. 2.

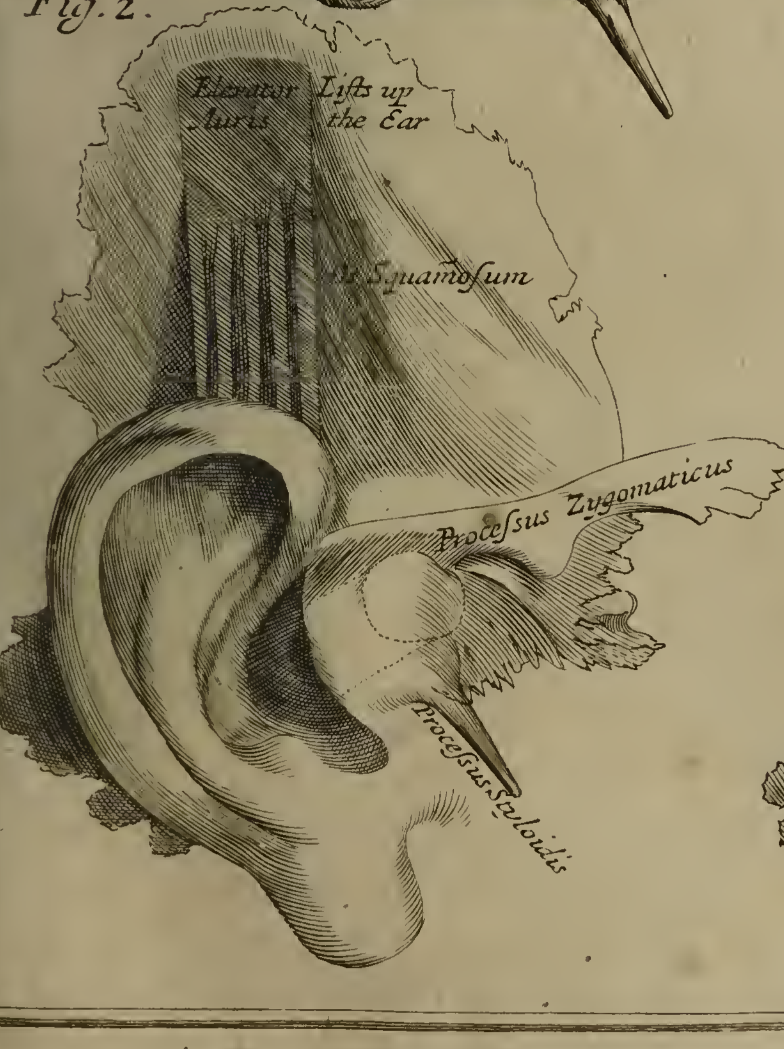
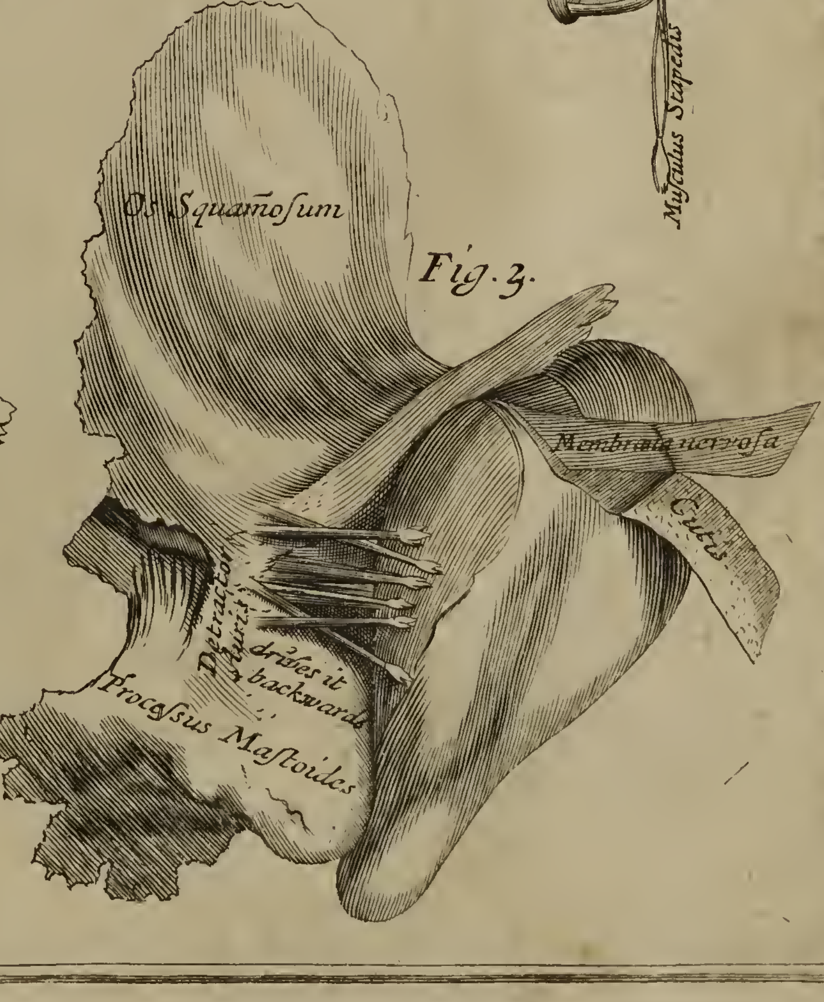


Fig. 3.



ſiderablement Offencies; C'eſt de quoy J'ay donne divers Exemples Memorables dans nos Journax de Medicine, Tom. prim. pag. 17. & 527. & Tom. $3^{me.}$ pag. 43. *Cela fait Voir, que dans les ſimples Fractures du Cranê, quoy que d'aillures conſiderables, on peut attendre beaucoup de la Nature, Lors que ſon action eſt ſont enue par L'Induſtrie d'un Artiſte Experimenté; C'eſt de quoy L'Hoſpital de Londres Vient de me fourver une preuve qui me paroiſt Digne du Remarque; Car, ayant eſté Convic par* Mr. Browne *Chirurgien Ordinaire du Roy et de cet Hoſpital de my rendre le 15 de Mars dernier 1685, j', eus le plaiſir dy'voir une Femme de ſoixante et treize ans qui par une cheute arriveé environ ſex ſemains auparuvant, s'eſtoit fait une plaije contuſè au Front, partie ſuperieure & aucunement ſeneſtre, avec deux Fractures ſi conſiderables au Coronal, que* Mr. Browne *avoit avec L'Elevatoiretirè une portion des deux Tables de cet Os, de la grandeur d'une piece de Deux Sols, ce qui avoit heureuſement prevenu Les accidens qu' on pouvoit crainde de la part du ſang eſpanche ſur la dure Mere que cette Femme n'avoit rendu aucune Muliere ſanguinolente, Ny parle nez, ny Oreilles, et qu'elle n'avoit Souffert ny voviſſement, ny Fiebure, ny Convulſion, la plaije eſtant d'aillures diſpoſeé à une parfait Cicatrization.* Which in Engliſh runs thus:

Chyrurgical Obſervations to be incerted into the Journal of Phyſick.

IF we may believe moſt *Authors,* we muſt generally make a fatal *Prognoſtick* of Wounds in the *Head,* that are attended with any *Fracture* in the Skull; in the mean time its certain, that thoſe ſorts of Wounds have many times come to cicatrize, tho' the *Dura,* and *Pia Mater;* yea, the very Subſtance of the Brain were conſiderably affected, ſeveral remarkable Examples whereof, I have ſet forth in our Journals of *Phyſick,* Vol. 1. page 17. and 526. Vol. 3. page 43. which ſhew, that in ſimple Fractures of the Skull (altho' conſiderable in themſelves) one may expect a great Help from Nature her ſelf, when its Action is backt with the *Induſtrious* Hand of a *Skilful Artiſt.*

The *Hoſpital* of St. *Thomas Southwark,* hath afforded me an Inſtance thereof, which to me ſeems worthy of *Obſervation*; for on the 15th. of *March* 1685 having been invited thither by Mr. *Browne* Chyrurgeon in Ordinary to the King, and to that *Hoſpital,* to go along with him to the ſaid *Hoſpital*; I had the good Fortune to ſee an Old Woman of 73 years of Age, who by a fall ſhe had received ſome weeks before, with it alſo received a contuſed Wound in the upper part of the Forehead, and ſomewhat towards the left ſide, with two Fractures of the *Frontal* Bone, both of them ſo conſiderable, that Mr. *Browne* by the help of his *Elevatory* had taken out a piece of the two *Tables* belonging to that Bone, much of the bigneſs of a *Three-pence*; which Operation had ſo fortunately prevented the Accidents that might have enſued from the extravaſed Blood upon the *Dura Mater*, that the Woman had not voided any Blood, either by her *Noſe*, or *Ears*, or ſuffered any *Convulſions* or *Vomitting*, or *Fever*; the Wound then being fairly enclinable to a Cicatrice; (thus much of *Monſieur Blegny's* Remark of her Caſe) who within a ſmall time afterwards, was ſent from the Hoſpital perfectly cured.

This you have at Tab. VII. Fig. I.

Corrugator.

This draws the *hairy Scalp* backwards.

THIS *Muſcle* takes its Name from its Uſe, or rather from *Con* & *Rugo*, which ſignifies to wrinkle; or, *Frontem Corrugare*, to knit the *Brows*. This *Muſcle* and its Partner, as *Volcherus Coiter* writes, doth ariſe near the greater *Canthus*, or Orbite of the Eye, and ſeems to end about the middle of the *Eyebrows*; and tho' they are not plainly apparent in all men, yet in ſome they fairly repreſent themſelves, and are generally allowed to bring the Skin backwards; by which Action, they alſo ſmooth the Front.

This you have at Tab. VII. Fig. I.

Occipitalis.

This helps the former.

THERE are two other Muſcles found in the *Occiput*, but they are not commonly to be ſhewn in all people; they are ſhort, broad, and thin, ariſing fleſhy from the tranſverſe Line of the *Occiput*, (from whence they do take their Names) and then becoming Tendinous, are ſeen to intermix themſelves with the *Pericrane*; they ariſing with right Fibres marching upwards, are ſometimes ſeen to border upon the *Muſcles* of the Ears: And hence it is, that they who have theſe *Muſcles* very large, can at their pleaſure bring the Skin of their Heads backwards, as *Diemerbroeck* well obſerves. Theſe *Muſcles* are not

Obſervat.

to be ſhewn in any of my Figures, much leſs mentioned, but in my laſt before this; when they operate, they are allowed to pull the hairy Scalp backwards.

History. I ſhall here add an Obſervation of a *Watermans* Caſe, who was my Patient in the Hoſpital alſo, that was there cured of a contuſed Wound, and a large Fracture on the right ſide of his Head: His Name was *Charles Cock*, and lived at *Rotherith*, he being on Board the *Coronation* under Sir *Ralph Dalival*, in the Engagement with the *French*, who there received a very large Fracture on his right *Bregma* on the 30th. of *June*, it was occaſioned by a Splint from a Ship; upon the receiving of which, he both became dumb, ſenſeleſs, and ſpeechleſs for ſome time: The fourth day after this Miſchief, he began to come to himſelf, and was ſent to the next Port-Town, which was *Dover*, and was there placed under the Hands of the then Chyrurgeon, appointed to take Care of the Sick and Wounded for that place, who within a few days applyed the *Trepan* to him, but with little effect; afterwards he was ſent up to St. *Thomas* Hoſpital, where he became my Patient, where viewing his Caſe, with the reſt of my Brethren, we judg'd it very dangerous, if not mortal: However, I being adviſed by *Cornelius Celſus*, that *In caſu deplorato præſtat Remedium anceps quam nullum*, I uſed my beſt Care to diſcharge the foul Bones, and remove thoſe Fungus's which dayly did ariſe from his Wound, and laying open almoſt all that ſide of his Head, I made enquiry into its Tables; and finding by my Applications that a very large piece of the Bone began to grow looſe, through which the aforeſaid Chyrurgeon had entred his *Trepan*; I at length diſcharged it, and after that two other pieces (which made up the part of the Bone through which the *Trepan* paſſed, as may plainly appear by the bore there made by the Inſtrument in it) without any Flux of blood, or any Injury to the Patient; the which being removed, the *Syſtole* and *Diaſtole* were as plainly ſeen to move as any thing whatſoever; and by applying over it a Syndon dipt in my *Balſom*, and now and then uſing *Catagmatick* Powders to remove his Fungus's, there came on a new *Callous* from the edges of the Bones, and after much trouble, the Patient arrived at a very good Cure. This Cure was alſo performed by me in St. *Thomas* Hoſpital, when Dr. *Briggs*, and Dr. *Dawkins* were Phyſitians there, the firſt of which is alive, and can juſtifie the Truth of it; during the time he was under my hands, he had neither *Fever*, nor *Convulſions*, nor did *Vo-*

mit, or *Bleed* at *Noſe* or *Ears*, but dayly went up and down; nor was he ever curious about his Diet, or ſtrict in obſerving any regular Method as to his Living; he was afterwards twice Preſt into his Majeſty's Service; but I going along with him to the Lords of the Admiralty, had him ſoon diſcharged, after they had ſeen the Pieces of the Bones taken from his Skull. And the Patient is very well and hearty at the Writing hereof, and now exerciſeth a Watermans Trade.

Orbicularis Clauſor, or the *Orbicular Cloſer.*

This ſhuts the *Eye*.

THIS *Muſcle* hath its Name from its Orbicular Set of Fibres, which do Circularly Encloſe the *Eye-lids*: *Veſalius* and *Bartholine* allow this a ſingle *Muſcle*, planted between the *Membrana Carnoſa*, and the *Pericrane*, near the Roots of the *Noſe*, it taking its Origination from the inner Angle; and is carried under the lower Lid, with Orbicular Fibres to the outward Angle, and afterwards Enwrapping the upper Eye-lid, maketh its Inſertion into the greater Angle where it began.

Obſervat.

This *Muſcle* at the firſt view, ſeems indeed but one *Orbicular Muſcle*, but upon a more ſtrickt enquiry, it will diſcover it ſelf to be two Semicircular *Muſcles*, of which the upper and larger being implanted into the upper *Eye-lid*, takes its Origin from the inner Angle of the *Eye*, near the *Noſe*, and paſſing thence the length of the upper *Eye-lid*, is Inſerted into the outward Angle of the *Eye*; and being brought downwards, ſmooths the upper Lid, and covers a great part of the *Eye*; the other ariſeth with a ſharp Origin from the ſide of the *Noſe*, ſomewhat under the former, and paſſing croſs the lower Lid, is Implanted with a broad Inſertion into the upper Eye-lid, where it adjoyns it ſelf to the lower Lid, ſo that the *Muſcle* of the upper *Eye-lid* pulls it down, and that of the lower Lid lifts it up, which plainly diſcovers to us, that this muſt neceſſarily be two diſtinct *Muſcles*, and that each of them have different Originations and Inſertions allow'd them.

This is Shewn at Tab. VII, Fig. I.

Elevator

Elevator Palpabræ, or the *Eye-lids Elevater.*

THIS is allow'd to ariſe ſharp and fleſhy from the upper Orbite of the *Eye*, near the *Elevator*, where the *Optick Nerve* hath its Tranſmiſſion, it having a thin and fleſhy Origination, and is Expanded with a broad and thin Tendon into the Margine of the *Palpabræ*, and by raiſing the ſame up, does open the *Eye* with it.

This opens the upper *Eye-lid*.

This is not to be ſhewn but with the other. Muſcles *of the* Eye, *after it is taken out of the* Skull.
This with the former is ſhewn at Tab. VII, Fig. I.

Elevator Naſi Alarum, or the *Raiſer* of the *Pineons* of the *Noſtrils.*

THE *Noſtrils* are a curious Apartment framed out of a bony and griſly Subſtance, covered over with Skin, to keep the inward Paſſages open, as ſo many convenient and uſeful Tubes or Pipes for letting in of the Air, being allowed the proper Inſtruments of Breathing, as well as Organs of Smelling; whoſe inward Parts being encircled with a fine thin Membrane, interwoven out of nervous Fibrils, gives it that ready embracing, and embodying with aiery Particles, which occaſions the various Appulſes upon theſe its Fibres, which makes them the proper Inſtruments of ſmelling; and if we conſider the Structure of the *Noſe* as to its Frame, we may find it a fine piece of Workmanſhip, made out of ſeveral parts, as Skin, Bones, Cartilages, Glands, Membranes and Muſcles, all curiouſly melted into one another in good Proportion, and decent Figure: We begin with theſe Pair, which are ſeen to ariſe from the Top of the Bone of the *Noſe*, near the *Lachrymal* Cavity, with a ſharp and fleſhy beginning, and falling down towards its ſides, in a Triangular Figure, not much irreſembling a Greek △, it marcheth downwards the length of the Bone, and is inſerted broad and fleſhy into the *Naſi Alæ*.

This dilates the *Noſtrils*.

This is not to be found in all Perſons, its ſhewn at Tab. VII. Fig. I.

Dilatator Naſi Alæ, or the *Noſtrils Dilater.*

This dilates the *Noſtrils.*

THESE *Muſcles* are very ſmall and thin, and very ſcarce diſcernable, ſave only in Naſute people, where they appear fleſhy at the Root of the *Alæ*, and ſo climbing tranſverſely upwards, are ſeen inſerted into the upper parts of the *Alæ*, and by raiſing them, do at the ſame time open the *Noſtrils*, as *Veſlingius* obſerves.

Theſe are ſo ſmall, and placed ſo inward, that they are not to be ſhewn by any of my Figures.

Conſtrictor Naſi Alarum, or the *Noſtrils Cloſer,*

This cloſeth the *Noſtrils.*

THIS is much like the former for bigneſs, it lodging its ſelf inwards, near the Membrane which covers the Bone of the *Noſe*: It ariſeth fleſhy at the Root of the *Nares*, and is tranſverſly carried and inſerted to the Roots of the *Naſi Alæ*, and upper parts of the upper Lip, and being very ſmall, is rarely found out, ſave only in naſute perſons, whoſe general Frame of Fibres, are uſually ſeen thicker, larger, and more apparent than in others.

This is ſhewn in its place at Tab. VII. Fig. I.

Zygomaticus, or *Diſtortor Oris.*

This brings the *Lip* upwards.

THE *Lips*, as they are made of delicate ſoft and ſpongy Fleſh, neatly covered over with a fine Skin, painted with an admirable Vermilion Bluſh, and as they are ſtuft up with Membranes, and diverſe Glands, ſo have they allowed them both Veins and Arteries, as well as nervous Fibrils and Muſcles, to give them Senſe and Motion, by which they ſerve us like proper Organs in performing Variety of Motion: This *Muſcle* which carries the Name of *Zygoma*, by *Riolan* hath its Denomination, upon its ariſing round and fleſhy from the

Jugal proceſs, and marching obliquely downwards and forwards through the Cheeks, is inſerted into the ſide of the upper Lip near *Primus Naſi*, bringing it upwards in its Operation.

This you have at Tab. VII. *in its place.*

Elevator Labii Superioris, or the upper *Lips Elevater.*

THIS *Muſcle* ariſeth fleſhy from the *Os Zygoma*, immediately above the former, and obliquely deſcending under the Skin of the upper *Lip*, is implanted into the *Lips*, where they are joyned together, bringing them upwards and outwards.

This brings the *Lip* upwards and outwards.

This is ſhewn at Tab. VII. Fig. I.

Depreſſor Labii Inferioris, or the lower *Lips Depreſſer.*

THIS ariſeth fleſhy, from the lowermoſt and outermoſt part of the lower Jaw, whence obliquely marching, it is broadly inſerted into the middle of the *Lips*, and in its Operation, is ſaid to bring it downwards and outwards:

This brings the lower *Lip* downwards and outwards

This you have at Tab. VII. Fig. I. *under the lower* Lip.

Depreſſor Labii Superioris, or the upper *Lips Depreſſer.*

THIS ariſeth fleſhy from the fore part and outermoſt part of the upper *Jaw* above the *Gums*, and in its aſcent, is inſerted into the Roots of the *Naſi Alæ*, and upper parts of the upper *Lip*, forcing the upper *Lip* and *Alæ* downwards; and by bringing them cloſer together in their Operations, doth advance our ſmelling of things grateful, or ingrateful; and by reaſon of this Contrariety of Motion, this *Muſcle* by ſome *Anatomiſts* is taken for two Pair of *Muſcles*.

This brings the upper *Lip* downwards.

This is deſcribed at Tab. VII. Fig. I.

Elevator Labii inferioris, or the *Raiſer* of the Lower *Lip.*

This brings the lower *Lip* upwards and outwards.

THESE Pair of *Muſcles* are ſeen to lodge within the lower *Lip*, being by ſome *Anatomiſts* called *Par Mentale*, they ariſing fleſhy from the lower part of the nether *Jaw* near the *Gums*, and falling directly downwards in their Inſertions, to the lower part of the outward part of the Skin, do in their Operations raiſe the lower *Lip* upwards.

This you have at Tab. VII. Fig. I. *in its place.*

Orbicularis, or *Sphincter Labiorum*, or *Orbicular*, or *Sphincter* of the *Lips*.

This purſeth up the Lips.

THIS Orbicular *Muſcle* is planted in the middle of the five Pair of proper Muſcles belonging to the *Lips*, and being common to both *Lips*, and conſiſting of a ſoft ſpongy Fleſh, is encircled with many Orbicular Fibres running about it, by which it wraps in the Margine of the Mouth, and cloſeth the *Lips* in Form of a *Sphincter*.

Annotat.

This Orbicular Muſcle is an Univerſal Antagoniſt to all the reſt of the Muſcles, keeping them in right Order, and allowing them an equal Ballance to perform their *Tonick* Motions.

The prime Uſe of the Muſcles of the *Lips* may be thus deſcibed, as Dr. *Collins* worthily obſerves: The *Zygomaticus* borrowing its Origin from the outward part of the *Os Jugale*, and the *Buccinator* from the fore part of the acute Proceſs of the nether Jaw, and the *Elevator* of the upper *Lip* from the 4th. Bone of the upper Mandible, do deſcend obliquely, and concenter about, or in the Angle of the *Lips*; ſo that this Triade of auxillary Muſcles, contracting themſelves by their carnous Fibres, from their Inſertions towards their Origins, do endeavour to draw the Angle of the *Lips* laterally, and ſomewhat upwards towards the Region of the *Face* under the *Ear*, and thereby would perform or make a wry Mouth, were not ſome *Muſcles* of the *Lips* controuled by the *Antagoniſt Muſcles*, ſeated in the oppoſite ſide of the *Face*, which do countermand thoſe of the other ſide in their lateral oppoſite Contractions, and do mutually reduce themſelves to a *Tonick* Motion, and bring the upper and lower Lip (which is ſomewhat drawn downwards by the *Depreſſors* of the lower Lip) to a kind of a ſtrait decent Poſture, elſe the upper Lip would be too much elevated, were not the *Muſcles* of the Lips ſomewhat depreſſed, by the *Muſcles* ariſing out of the lower edge of the *Chin*, and inſerted in the Angle of the *Lips*. And laſtly, the Orbicular Muſcle would by its annular Fibres purſe up the *Lips*, by bringing the Angles nearer each other, and hereby disfigure the Mouth, was it not bound to its good Behaviour, as being laterally and equally diſtended on each ſide, by the oppoſite Muſcles inſerted in the Angles of the *Lips*, reducing as well themſelves, as their *Sphincter*, the Orbicular Muſcle, to a *Tonick* Motion, which gives the Mouth the Advantage of cloſing the *Lips* in a pleaſant Decency, rendring the *Mouth* and *Face* full of Air and Beauty.

This you have at its proper place at Tab. VII. Fig. I.

Buccinator, or *Conſtrictor*, or the *Trumpeting Muſcle.*

IT is called *Buccinator* from its uſe, in forcing the Breath outwards; and *Conſtrictor*, from its bringing the *Cheeks* inwards in Maſtication: Its a *Muſcle* aſſigned both to the *Lips* and other parts, and doth borrow its Origin from the *Gums* belonging to the upper Mandible, and does terminate in the lower Mandible; and being thin and membranous, as well as broad and fleſhy (intermix'd with a various Set of Fibres, ſo firmly annext to the inner Coat of the Mouth, that they are ſcarce thence diviſeable, as *Diemerbroeck* writes): Thro' this *Muſcle* paſſeth the *Ductus Salivalis Superior* (which is eaſily found out in a *Sheeps-head*) and in all our Readings at the *Hall*, they are uſually put together by naming it *Buccinator cum Ductu Salivali.*

This brings the *Cheek* and the *Mouth* to the ſide.

The Uſe of this *Muſcle*, is, that by bringing the *Cheeks* inwards in Maſtication, it forceth the ſolid Nutriment upon the *Teeth*, for its better Comminution; and when a Proportion of Air is encloſed in the Mouth (whereupon the *Cheeks* are blown up, and afterwards contracted by the ſtronger and gentler Mo-

Obſervat.

tion of the *Muſcles*) that the confined Breath may be expelled with greater or leſs Force, into any kind of Inſtrument of Muſick whatſoever.

This is ſhewn at Tab. VII. Fig. I.

Quadratus, or *Platiſma Muodes.*

This draws the *Cheeks* downwards

THIS has its firſt Name from its Figure, it being *Quadrangular*; and *Galen* gives it the other from its *Muſcular Expanſion*; it is generally allowed one of the common *Muſcles*: It is a Membranous Encloſure cloſely adhering to the Skin, and ariſing from the *Spines* of the *Vertebres* of the *Neck*, *Scapula*, *Clavicle* and *Sternon*, running upwards with oblique Fibres, and is implanted at the *Chin*, *Lips*, and *Roots* of the *Noſe*, which parts it brings obliquely downwards; and being ſo cloſely joyned to the Skin, it ſeems to afford it Aſſiſtance in opening the Mouth; ſometimes this *Muſcle* hath been ſeen to reach the Root of the Ear. In raiſing this *Muſcle*, be careful of leaving its Elongation, that makes *Adductor Auris ad Anteriora*, which you will rarely miſs: Theſe *Muſcles* are perfect *Antagoniſts* to the *Temporal Muſcles*, which bring up the lower Mandible, and cloſeth the *Lips*; this alſo is allowed to aſſiſt the *Digaſtricus*, in joynt Contractions in depreſſing the lower Mandible, and opening the Mouth, by ſeparating the lower from the upper *Lip*, and the nether from the upper Mandible.

Annotat.

This you have at Tab. VIII. Fig. I. *laid bare.*

Elevator Auriculæ, or the *Ears Elevater.*

This lifts up the *Ear.*

IT's by the pleaſing Senſe of Hearing, that we make our ſelves Maſters both of Converſe and Converſation; and by affecting our Ears with Vocal Sounds, we arrive at the inward Conceptions and Paſſions of the Mind: Now, whereas the *Allwiſe Maker* hath planted the Ears on each ſide of the Eyes, that we may more readily become Maſters of Sounds, conveighed by the Orbicular Motion of the Air naturally mounting upwards; ſo hath this fine *Auricular* Structure allowed it diverſe Proceſſes and Cavities, finely carv'd cut one within another: Its ſeen alſo furniſhed with *Veins*, *Nerves*, and *Arteries*, and as the Inward *Ear* is the principal Organ of hearing, and hath ſeveral parts given it, as the *Auditory Paſſage*, the *Tympanum*, and the ſmall Bones to brace it in with, ſo hath it allow'd it Muſcles fitted and deſign'd for various uſes. This Muſcle of the *Ear* ſhews its Uſe from its Name, it ariſing from the external Termination of the *Frontal Muſcle*, it being framed of divers fleſhy Fibres, covering the *Temporal Muſcle*; and being thin, and membranous, is carried over it, and growing narrower, is Inſerted into the upper part of the *Ear*, bringing it upwards and forwards.

Lycoſthenes tells us of a Boy, born on the 4*th.* of *December* 1556. without *Ears*, who in lieu thereof, had two ſmall Cavities, which were ſo cloſe ſhut together, that he could not hear any thing by them, and that he lived in good Health till the Month of *Auguſt* following; and of another who was born without *Ears*, *Eyes* and *Noſtrils*, with a *Mouth* only given to his *Face*. Hiſtory.

This is ſhewn at Tab. VII. Fig. II. *and at* Tab. IX. Fig. VI.

Detractor Auris, or the *Ears Detracter.*

THIS *Muſcle* ariſeth fleſhy, broad, and ſometimes Fibrous, from the back part of the *Head*, near the *Mammillary Proceſs*, and growing narrow in its Progreſs, is Inſerted into the *Cartilage* which environs the *Ear*: Be careful in raiſing the *Cutis*, leaſt you take up this *Muſcle* with it, and ſo looſe him. This brings the *Ear* backwards and downwards.

This *Muſcle* by ſome is allowed a part of *Quadratus Buccas Detrahens*, and by *Du Verney* is call'd *Triceps Auris*, from its three fold Origination allow'd it. Annotat.

Columbus Anat. Lib. 15. Writes, he hath obſerv'd *Ears* in ſome Men like thoſe of *Bruites*; and *Thomaſus Thom.* Cap. 19. writes of a Woman, who brought forth a Child with *Ears*, ſo large, and ſo great, that they cover'd its little Body, much like a plume of feathers. Hiſtory.

This you have at Tab. VII. Fig. III. *and at* Tab. XI. Fig. IV.

Adductor Auris, or the *Ears Adducter.*

This brings the *Ear* forwards.

THIS is a common *Muſcle*, being a part which *Spigelius* calls *Quadratus Buccas Detrahens*, and is alſo allow'd a part of *Platyſma Myodes*, as *Galen* calls it, (both which are but one and the ſame *Muſcle*;) from its Inſertion you'll find a fleſhy and fibrous Elongation Implanted into the root of the *Ear*.

This you have at Tab. VII, Fig. I.

Abductor Auris, or the *Ears Abducter.*

This brings the *Ear* backwards.

THIS is planted at the *Occiput*, and ariſeth above the *Mammillary Proceſſes*, from a Knot of *Muſcles* belonging to the *Occiput*, with a narrow Origination, and being carryed Tranſverſly downwards, is Inſerted with a double, and ſometimes with a treble Tendon into the back part of the *Ear*; in *Oxen*, *Horſes*, and the like four-footed Creatures, theſe *Muſcles* are ſeen much larger than in Man, and many times are ſeen more numerous, and a more evident uſe is made of them.

Hiſtory.

Bauhin. de Corp. Human. Fabric. Lib. 3. *Cap.* 22. writes, that the *Muſcles* moving the *Ears*, are ſeldom found in Men, yet he knew two who could move their *Ears* at pleaſure.

G. Wolphius writes of one having a Fool, who could make an hundred ſort of wry Faces, and could both move his *Ears*, and his *Eye-brows* any way he pleaſed.

This you have at Tab. VII, Fig. I.

Temporalis, or *Crotaphitis.*

This brings the Nether *Jaw* upwards.

MAN hath allow'd him a ſhort *Nether-Jaw* to give his Face an Oval Figure, and provident *Nature*, leſt the *Muſcles* might be any wiſe injur'd with too much Weight of the *lower Mandible*, hath cunningly contrived, and drill'd many Cavities thro' it, which ſhe has fill'd with Marrow: On each ſide towards the termination of this Bone we find a

Proceſs mounting upwards, and ending in a *Cone*, to which the Tendon of this *Temporal* Muſcle is firmly annext. The ſtrong and various Motions of the *Nether Jaw* is truly perform'd by the different Contractions of its *Muſcles*; among which, this, we now are deſcribing, doth gain a preference from the reſt, whoſe Courſe of Fibres being various, are as ſtrangely put together to enlarge their ſtrength. This pair inveſted with the *Pericrane*, do borrow their Originations from the Bones of the *Front*, *Temples*, and *Sinciput*, from whence they ariſe with a thin fleſhy beginning in a Semicircular Figure, and growing more fleſhy in their Deſcent, and afterwards thinner again towards the *Os Jugale*, it is raiſed into a Circular Form, both to ſecure, and give place to the lower part of the *Temporal* Muſcle, which creeping under it, doth Inſert it ſelf with a ſhort and ſtrong Tendon into the ſharp *Proceſs* of the *Lower Jaw*; and in its Contraction, by drawing it upwards, does at the ſame time cloſe the Teeth of the Upper, with thoſe of the Nether *Jaw*; which is ſeen ſometimes Acted with that vigour and force, that the Mouth cannot be Involuntary opened, unleſs by the Interpoſition of ſome ſcrew'd Inſtrument, as is uſually ſeen in thoſe Perſons violently troubled with the *Epilepſy*, where we many times are forced to uſe a *Speculum Oris* to force open the *Jaw*, in order to make way for letting in of ſome proper Liquor into the *Mouth*, uſeful in theſe Caſes.

Annotat. This *Muſcle* is accounted the ſtrongeſt *Muſcle* belonging to the *Nether Jaw*, and its apparently found dangerous to make Tranſverſe Inciſions here, as ſhall be made good by Hiſtorical Obſervations, eſpecially in the lower part thereof, by reaſon of the variety, as well as multiplicity of Fibres allow'd it, which being Tranſverſly wounded, occaſions frequent Convulſions.

Hiſtory. *Columbus Lib.* 8. *Cap.* 3. Writes, That he has oft obſerv'd that conſent between the *Eye*, and the *Temporal Muſcle*, that the *Temporal Muſcle* being at any time hurt, the *Eye* becomes ſharer with its Prejudice; and this proceeds from ſome ſmall Branches of the 2*d.* pair of *Nerves*, which are inſerted into it.

Obſervat. Obſerv. 8. *Fabrit. Hildan. Cent.* 2. you read that *Hippocrates* writes, that the *Temporal Muſcle* cannot be wounded without danger of Life; for as he ſays, if the left *Temple* be wounded, the right Operates by the Diſtention of its *Nerves*; (to uſe *Hippocrates* own Words) If the right, the *Nerves* are diſtended in the left; for the oppoſite *Muſcle* of the ſound part, whilſt it is in Action, draws the Mandible to it in its Office, and the injur'd or wounded *Muſcle* being quiet, and drawn with the other Mandible towards the ſound part, cannot but produce great Pain, if not Danger of Life: Beſides, ſeveral *Veins* and *Arteries* do paſs through the *Temporal Muſcle*, which by a Tranſverſe Inciſion being at any time made, may occaſion large and dangerous fluxes of Blood: As he himſelf writes, he ſaw in a Girl of fourteen Years of Age, where you have the ſtory thereof at large, as a Caution to all Young Surgeons, he Adviſeth, that they never open the *Temples* or *Temporal Muſcles* croſs ways, for they will certainly find direful Symptoms follow their Knife, in that as all *Muſcles* are made up, and intermixt of various Fibres, which Fibres do Unite and terminate in the end of the *Muſcles*, before they run into Tendons; as *Galen* hath it, *Lib.* 12. *de Uſu. Part. Cap.* 3. So if they be cut o'rethwart, great Pains uſually ſucceed thereon, by reaſon theſe Parts are endu'd with no ſmall Senſe, they having a Nervous Origination, whence oft times Convulſions are ſeen to happen; but if neceſſity require the opening of this *Muſcle*, do it according to the planting of its Fibres, ſo that they may not be cut or divided, whereby you'll be freed from all fear of Convulſions and other ill Symptoms. Admonit.

History. I cannot paſs by a very remarkable Caſe, which hapned in our *Hoſpital* of a Patient of mine, in a Soldier with four Fractures in his Skull, *&c.*

One *James Crawford* a Scothman, and a Soldier in the Lord *Dugglas*'s Regiment, in *June* 85. had four Fractures in his Skull, one juſt above the *Temporal Muſcle*, the ſecond and largeſt between the *Sagittal* and *Lamdoidal* Sutures, a third under the ſecond towards the right Side, the fourth upon the *Sagittal* Suture, with all the Bone of the right *Bregma*, *foul* and *Carious*, both outwards and inwards, all which were occaſion'd by blows given him from his *Captain*; he was my Patient in St. *Thomas*'s *Hoſpital* for about ſix Months, and at ſome times in a proſpect of Recovery: At his firſt coming thither, he had a large Tumor in the upper part of his Head, which I took for a *Steatoma*; and having laid it open, out of it came a Subſtance much reſembling Brain, which being ablated, I ſaw the Tumor for ſome ſmall time abated; afterwards new *Fungus's* aroſe in the ſame place, and cloſely tracing it to the bottom, I found a Fracture there, and having laid the *Cranium* bare, I remov'd ſeveral *Fruſtles* or Splints of Bones from it; after which I apparently ſaw a very large Perforation of the Skull. Dr. *Dawkins*, and Dr. *Briggs*, who were then our *Phyſitians* of the ſaid *Hoſpital*, with divers other of the *College*, and ſeveral of our moſt Eminent *Surgeons* of this Town, had been frequent Viſiters of his Caſe; ſoon after we ſaw another *Fungus* ariſing out of another Perforation, juſt above the *Temporal Muſcle*, which grew to a great Magnitude; this by our dreſſings began to divide, and at times waſted, and turn'd out in ſeveral pieces; upon tracing of this alſo, we found a ſecond Perforation, as I ſaid before; about this we ſaw ſeveral ſtreams of Blood frequently Iſſuing out about it, which we ſtopt with our Reſtringents: A third *Fungus* was ſeen after this to ariſe in the left ſide of his Head, which was not opened till after his death. The great Remark in this Caſe, was, That we ſaw a Subſtance much reſembling that of the Brain, both in Colour, Subſtance, and make, and had in it the Motion of the Brain, which is deſcribed by *Authors*, viz. both *Contraction* and *Dilatation*, anſwering the *Syſtole* and *Diaſtole* of the *Heart*; hence both the Phyſitians, as well as Chyrurgeons were ſurpriſed how the Membranes of the Brain, could be wounded without the uſual Symptoms, as *Hipp.* mentions *Aph.* 50. *Sect.* 6. and 188. *Sect.* 2. for from his firſt coming to the *Hoſpital*, he neither had *Convulſion*, *Feaver*, *Vomiting*, *Delirium*, or *Stupor*, till the time of his Death; and while he was there, lived a very irregular Life to all manner of Method; he only had a *Hiccough* two days before he dyed: The dead Body being opened by me, before ſeveral Phyſitians and Chyrurgeons, I began with the Head, and cutting into the third Swelling, I found another Perforation, as I many times foretold and expected; and having taken off the upper part of the *Cranium*, and narrowly examining the *Dura Mater*, we found this to be his Caſe: The *Cranium* had four apparent large Perforations; at three of which iſſued out theſe three Tumours filled up with a Subſtance much reſembling the *Cortical* part of the Brain, which made us ſuppoſe it really to be ſo; and perhaps, by what I am now going to diſcover, may reaſonably be allowed an Excreſcence ariſing from the Brain its ſelf, much depreſt by the repeated Blows on his right ſide, it throwing forth on the contrary ſide many ſtrange and unuſual Productions; for upon ſcraping this Subſtance of the *Dura Mater*, with the blunt ſide of the Knife, we obſerved ſeveral *Foraminila* or ſmall Perforations made thro' it, from whence this Matter might iſſue, and be ſupplyed from the Brain; beſides, in one part of the *Dura Mater*, we obſerved a kind of *Pedunculus*, much reſembling a *Stem*, or *Stalk* in the inſide of the *Dura Mater*, which might well enough be allowed to give Growth to theſe Excreſcencies; one of which was ſuppoſed to be as large as a *Turkeys* Egg, and the other to equal the bigneſs of a *Pullets* Egg, and may (if you pleaſe to allow it) properly be called two præternatural *Cerebella*, or Appendages of the Brain its ſelf: The *Cranium* within ſide between theſe Fractures, was ſeen very carious; from all which, it may very well be worth our Obſervation, what *Monſieur de Blegny* writes in *Zodiac. Medico. Gal. Ann.* 1. pag. 78. 182. *Ann.* 2. pag. 154. *Fallop. de Vuln. Capit. in Gener.* cap 10. *Foreſt.* lib. 9. Obſ. 36. & Obſ. Chir. 2. lib. 6. *in Schol.* and ſeveral others who have writ of wounds of the Brain, that had no Symptoms followed them; it is moſt likely their Caſes were no otherwiſe, than what I have here now recited, and may ſuggeſt to us, how to treat theſe Caſes according to Art for the future; and probably, if this Matter after *Trepanning*, had been diſcharged, the Patient might have recovered, and theſe Perforations of the *Dura Mater* cloſed up again. But this was not this poor Fellows Caſe only, for beſides theſe, he had a very large Tumour on his left ſide upon his baſtard Ribs, covering that ſide three or four Hands in length, and about two in breadth; which Tumour was alſo occaſioned by Blows given him on his ſide, which gave him great Pain upon Coughing, and did no ſmall Injury to his Head, that made his Cure more difficult. Upon opening his lower Belly, we found nothing unuſual; but upon carefully examining his *Trunk*, (which we, next to his Brain) had a mind accurately to inſpect, we found, that from the Tumour ſome præternatural Matter had diſcharged it ſelf into its Cavity; which Matter was ſo corroſive and virulent, that it eat through the *Pleura*, and ſo ſtinking was it, that it annoyed the By-ſtanders; one of his Ribs of that ſide was eroded by it, ſo as that upon touching it, it crumbled into ſmall pieces: It further made its paſſage into the left Lobe of the *Lungs*, and this its fretting may be granted a ſufficient Cauſe of his ſo frequent Coughing; at the bottom of the

Lobe, there was alſo a *Vomica*, filled up with ſome Matter, and had been broke not long before his Death, which diſcharging its ſelf upon the *Diaphragm*, might be a ſufficient Occaſion of his *Singultus*, which he had ſome days before he died: He was naturally of a ſtrong Conſtitution, and not above 25 Years of Age; he might probably have endured the *Trepan*, for the Relief of his firſt Caſe, which we once thought fit to have performed; but it bordring upon the *Temporal Muſcle*, and penetrating both the *Coronal* and *Sagittal* Sutures, we thought it very hazardous, and ſo omitted it; but as to the Tumour on his ſide, it was ſo large, and accompanied with ſuch a Train of fatal Symptoms, that I queſtion whether any Artiſt could have done more, than was preſcribed in his Caſe; all which, altho' Dr. *Dawkins* is dead, yet Dr. *Briggs*, His Majeſties Phyſitian, and who was one of the Phyſitians of the ſaid Hoſpital, when this Man was there under my Hands, will juſtifie what I have writ, is nothing but truth, and deſerves to be made publick for the Advantage of all young Chyrurgeons, and others who have not had the Happineſs of an Hoſpital Practice.

In Relation to the Temporal Muſcle, and to the Skull, the Worthy Dr. Connor *has given me this following Obſervation*, viz.

" The *Temporal Muſcle*, puts me in Mind of an extraor" dinary Operation of Surgery, which I formerly ſaw per" formed in an Hoſpital at *Rome*; upon a Man that had the " *Os Syncipitis*, or the *Bone* of the *Crown* of the *Head*, which " is very large, and looſely joyned to the Ambient Bones, " by reaſon of a *Caries* (occaſioned, I ſuppoſe, by a Venere" al Diſeaſe) in the Sutures of the Skull: A Chyrurgeon " raiſed up the *Teguments*, and *Pericrane* of that ſide of the " Head, and took away with his Inſtruments, the whole Bone " of the Crown, and left all the Brain naked, only with the " *Teguments* on it, in that ſide: I was mightily ſurprized, to " ſee the Patient undergo all this, with ſo little Concern; " he having had no Symptoms, or any Inconveniency ſucceed" ed, ſave only, that he could not lye upon this ſide, for " Fear of preſſing too hard upon the ſoft Skin and Brain, againſt " the Pillow; this made me reaſon with my ſelf, and think, " that no Wounds in the Head can be mortal, unleſs there " follow too much Effuſion of Blood, or too great a Preſ-

" ſure upon the Brain; and that conſequently it was no Wonder, why this Man ſhould live, having had neither of theſe two ill Symptoms after the Operation; it gave me likewiſe room to believe, that moſt other Wounds are only mortal, by reaſon of the too great Loſs of Blood, or of a violent Pain which raiſes too great a *Fever*.

This you have ſhewn you at Tab. VII. Fig. I. *and at* Tab. VIII. Fig. I. *you have the ſame laid bare.*

Digaſtricus, Biventer, or *Graphoides.*

This brings the *Mandible* downwards, and opens the *Mouth.*

THE firſt and ſecond Names it takes from its double Belly, and the third, it ariſing from the Fore-part of the *Maſtoidal*, or *Teat* like Proceſs near the *Mammiformis*. It is ſuch a *Muſcle*, that ſcarce its Fellow is to be found in Humane Body; it takes its Origination from the Fore part of the *Maſtoidal* Proceſs near the *Mammiformis*; firſt growing fleſhy, then running into a *Tendinous* Body about its middle, does afterwards become fleſhy again; ſo that it appears like a double *Muſcle* put together by the Mediation of a ſmall round *Tendinous* Subſtance; and then growing fleſhy, does inwardly terminate in the fore and middle part of the *Chin*, being an *Antagoniſt* to the *Temporal Muſcles*, which in their Contractions do cloſe the *Mouth* and *Teeth*, by bringing the *Nether Jaw* upwards; and this *è Contrà*, giving them a contrary Motion, does open the *Mouth* and *Teeth*, by bringing them downwards.

This you have at Tab. VIII. Fig. I. *and at* Tab. IX. Fig. I, II.

Maſſeter, or *Manſorius.*

This brings the *Nether Jaw ſideways.*

IT hath its firſt Name, from its Uſe made of it in Maſtication, and *Lateralis* from its Situation: It is a *Muſcle* that ariſeth with a double Origination, ſtrong, ſhort and thick, it being partly fleſhy, and partly nervous, carried from the lower and inner Region of the *Os Jugale*, and from the upper Mandible, and is largely and ſtrongly tyed to the *Nether Jaw*; and from its Variety of Fibres which are allowed it, it not only pulls it forwards, backwards, and laterally, but alſo works it about.

Tab. VIII.

Musculi Uvulæ vocati à D.D. Croune primum in lucem eruti et publicè oſtenſi.

Fig: 2.

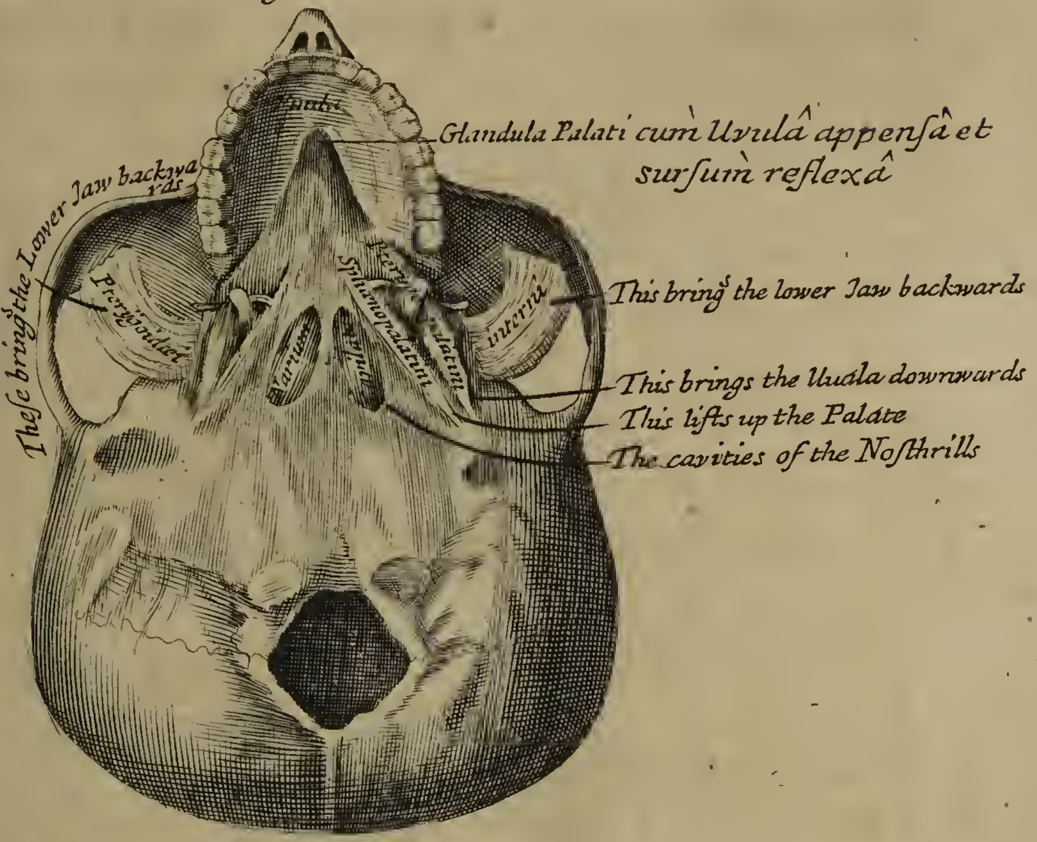

Glandula Palati cum Uvulâ appenſâ et ſurſum reflexâ
These bring the Lower Jaw backwards
Pterygoidæi
interni
Sphenopalatini
This brings the lower Jaw backwards
This brings the Uuula downwards
This lifts up the Palate
The cavities of the Noſthrills

Fig: 1.

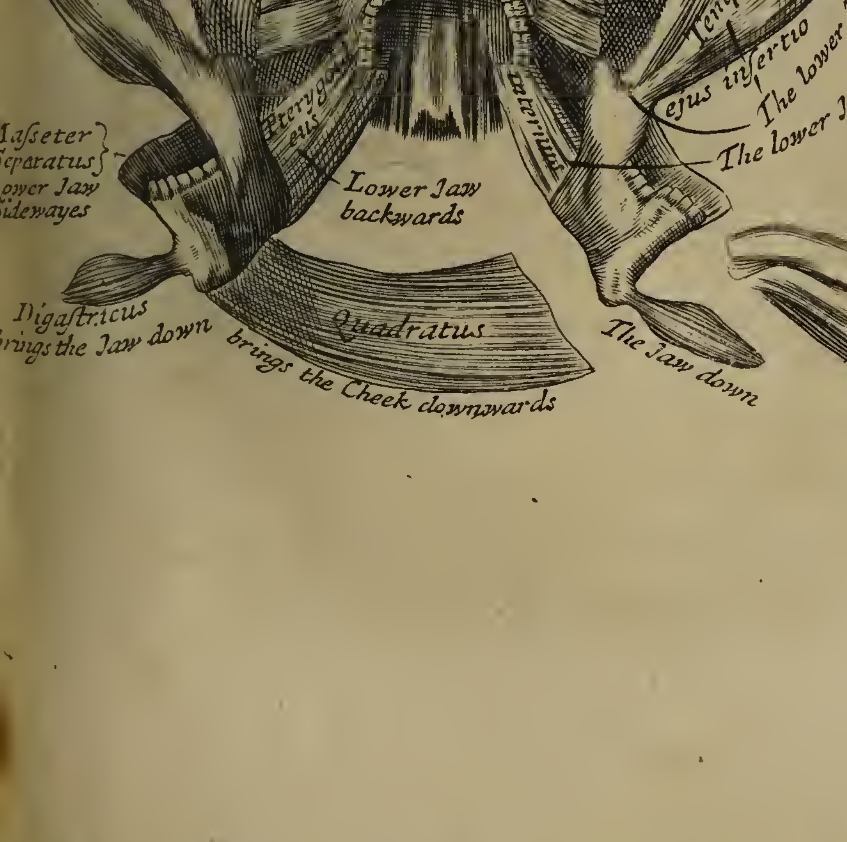
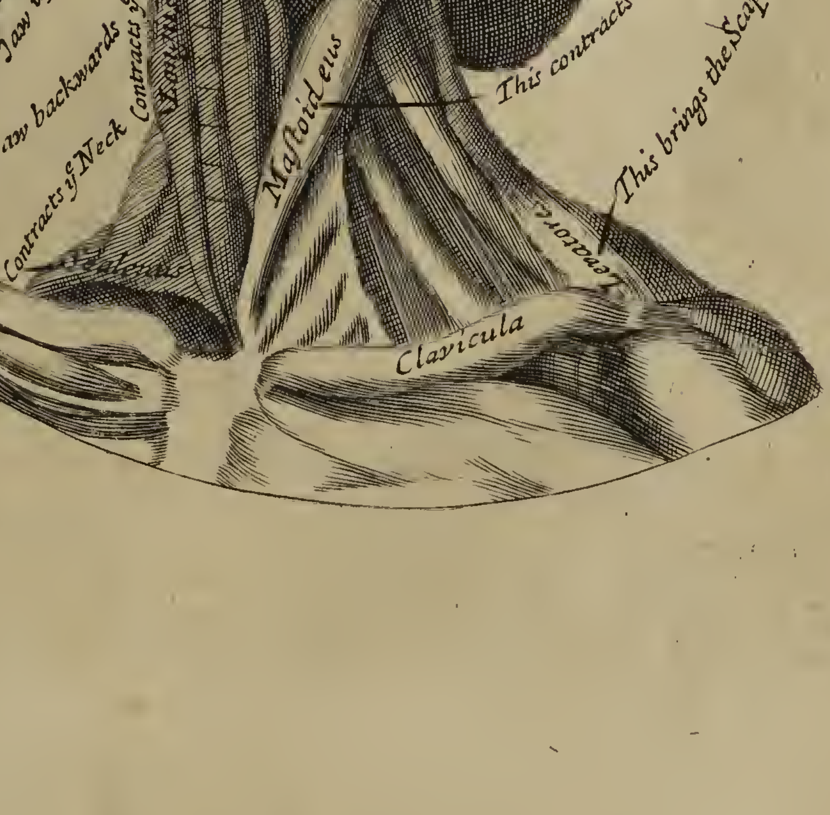


Fig: 3.



If you throw this *Muſcle* from its Original, or Inſertion, *Temporalis* will appear to view. Obſervat.

Its proper Uſe is employed in Maſtication, it moving the Lower *Jaw* eitherwiſe, and is ſeen to aſſiſt the *Temporal Muſcle*, in ſending the *Saliva* forwards, which it performs by the upper *Salival Ductus* paſſing over it. Its Uſe.

Oetheus writes, he ſaw a young Girl about 12 Years of Age, whoſe *Nether Jaw*, a Chyrurgeon finding putrified, wholly exfoliated it; over which Place, a Fleſh grew to ſo hard a nervous Subſtance, that ſhe made uſe of it to chew her meat for her Livelihood with it. Hiſtory.

This you have at Tab. VII. Fig. I. *and at* Tab. VIII. Fig. I.

Pterygoideus Externus, or *Alare Externum.*

This brings the *Nether Jaw forwards*

THIS has its Name from its Situation, it ariſing from the *Os Sphænoides*, or Wedge like Bone, as alſo from the outward part of the *Proceſſus Aliformis*, or Wing like Proceſs; it being ſtrong, nervous and fleſhy, and marching large in its deſcent, is inſerted by a ſtrong and broad Tendon into the inner part of the *Nether Jaw* laterally, juſt under the Tendon of the *Temporal Muſcle*, and brings the ſame forwards, and as it were beyond the upper.

This you have at Tab. VIII. Fig. I, II.

Pterygoideus Internus.

This brings it backwards.

THIS takes its Name from its Origination and Situation, it ariſing thick and ſhort from the inner Cavity of the *Proceſſus Aliformis*, or Wing like Proceſs, partly nervous, and partly fleſhy, and is inſerted by a ſtrong and broad Tendon into the inſide of the *Nether Jaw*, quite contrary to that of *Manſorius*, promoting the Action of the *Temporal Muſcle*, in bringing the *Nether Jaw* inwards and backwards.

Theſe *Muſcles* do never appear well, untill thoſe of the *Tongue*, *Larynx* and *Gulet*, be compleated in Diſſection. Obſervat.

The whole Performance of Maſtication, is managed by the joynt Concurrence of theſe *Muſcles*, and the ſucceſſive Annotat.

Motion of others, as Dr. *Collins*, and others do obſerve, in which the *Maſſeters*, and theſe *Pterygoidal Muſcles* chiefly are concerned with the *Buccinators* and the *Tongue*; the moving of the *Digaſtricks* more properly relating to others, which by depreſſing the *Nether Jaw*, do open the Mouth for letting in of the Nutriment; whilſt the *Temporal Muſcles* by lifting up the Nether Mandible, are ſeen to cloſe the *Teeth* with the Meat. Again, the *Digaſtrick Muſcles* and the *Quadrati*, depreſſing the *Nether Jaw* do open the *Teeth*, whilſt the *Temporal Muſcles* cloſing them, as naturally do by their contrary ſucceſſive Motion, ſtamp and leſſen the Meat, whilſt it is between the *Teeth*, and the *Pterygoidal Muſcles* and *Maſſeters*, do break it into ſmall pieces; the Internal *Pterygoidals* drawing the *Nether Jaw* outwards, and the External pulling it inwards, and the *Maſſeters* by reaſon of their Variety of Fibres, decuſſating each others in divers Angles, do aſſiſt each other in their Contractions, and helping the former, are allowed to bring the *Nether Jaw* both inwards and outwards, for the better leſning of our Nouriſhment in Maſtication; the *Buccinators* and *Tongue* aſſiſting them in keeping the Meat in its proper place.

Again, The Uſe of the *Muſcles* of the *Lower Jaw*, appears in the various Contractions of their Terminations, towards their Origins: The *Temporal Muſcle* moving from the acute Proceſs of the *Lower Mandible*, towards the *Os Frontis*, *Syncipitis*, *Sphænoides*, and the *Os Temporalis*, and the *Maſſeter*, contracting its ſelf towards the *Os Jugale*, and the firſt Bone of the upper Jaw, do lift up the lower Jaw, and the *Digaſtrick* Muſcle, ariſing from the Forepart of the *Mammiform Proceſs*, deſcends obliquely, and creeps under the lower Jaw with an intermedial Tendon perforating the *Muſculus Styloideus*; and the annular Ligaments, as a Rope paſſing through a double Pulley, which by a great Artifice of Nature (the Miniſter of the Allwiſe Grand Architect) doth pull down the lower Jaw, by the Aſſiſtance of the carnous Fibres, of the two Venters; one ariſing out of the Forepart of the *Proceſſus Maſtoideus*, and the other Belly of the *Digaſtricus* is inſerted outwardly into the middle of the lower Jaw; and the Muſcle *Quadratus Genæ* taking its Origin from the Spines of the Neck, and inſerted all along the outſide of the lower *Mandible*, doth pull the lower *Mandible* downwards: Whereupon theſe *Antagoniſt* Muſcles to the *Temporalis*, and *Maſſeter*, the *Digaſtricus* and *Quadratus* do open the mouth for the Reception of Aliments, which is ſtampt between the Teeth, *tanquam Piſtillis quibuſdam alimentum contundentibus, conterentibuſq*; by breaking the Aliment into ſmall Pieces or Particles, by the often repeated quick motions of the *Temporal*, *Manſorial*, and *Pterygoideal Muſcles* joyntly contracting themſelves: But if theſe laſt *Muſcles*, the *Pterygoidei Externi* & *Interni*, do act ſingly, their manner is different; the firſt ariſing out of *Aliform Proceſs*, and are inſerted into the inſide of the lower Jaw, at its edge, oppoſite to the Inſertion of the *Maſſeter*, and draws the lower Jaw backwards, when it acts ſingly; and the *Pterygoidei Externi* & *Interni*, taking their Origin from the external part of the *Pterygoidal Proceſs*, and *Os Sphænoides*, lodged in a concave part of the *Temples*, oppoſite to the *Os Jugale*, and taking its Progreſs backwards to the Inſertion of the Neck of the *Proceſſus Condiloides* of the lower Mandible: Theſe *Aliform* Muſcles, if they act joyntly, they elevate the lower Jaw, and aſſiſt the *Temporal* Muſcle and the *Maſſeter* in the raiſing the lower Jaw, in the Maſtication of Aliment, which is their Prime and common Action: The other Contraction of the lower Jaw inward and outward, is not of any great Uſe of eating, which is accompliſhed by the frequent Elevation and Depreſſion of the lower Jaw, and other oppoſite Motions of the lower Mandible; inward and outward involuntary convulſive motions, commonly called gnaſhing of the Teeth, are produced in malignant Feavers, and near the Approach of Death, as Dr. *Collins* very well obſerves.

This you have at Tab. VIII. Fig. I, II.

Styloceratohyoideus.

This brings the *Os Hyoides* upwards and backwards.

BEfore we diſcourſe of the Tongue, we ſhall offer at ſomewhat of the *Os Hyoides*, which is given to it, as a Prop for its more firm Structure, and for its more ready motion; where we may obſerve, when the *Tongue* is moved, this Bone is alſo moved with it, and this is performed by the Benefit of its *Muſcles*; amongſt which, this is reckoned one, which hath this name given it upon theſe three Accounts; it firſt ariſing fleſhy and ſharp, from the Root of the *Proceſſus Styloides*, or Beak-like Proceſs; and being ſmall and round, and afterwards growing larger, is implanted into the *Ceræa*, or Horn of the *Os Hyoides* under the *Chin*, or that Bone planted

ted at the Root of the *Tongue*, much reſembling a Greek υ, and therefore by ſome, called *Upſilodes*, and by others (tho' improperly) *Lamdoides*, from a Greek ʌ, and is infallibly found near the *Digaſtricus*, where it is divided, to make way for the Entrance of the Tendon of *Digaſtricus* belonging to the Nether Jaw, thro' which it obliquely runs; its Inſertion being at the lower part of the Horn, or rather towards the Baſis of the *Os Hyoides*, it bringing it obliquely upwards.

This you have at Tab. IX. Fig. I, II. *and at* Tab. X. Fig. I.

Coracohyoideus.

This brings the *Os Hyoides* obliquely downwards,

THIS *Muſcle* being very thin and long, hath its Name given it (as *Diemerbroeck*, and moſt *Anatomiſts* write) from its ariſing at the upper ſide of the *Scapula*, near the *Coracoidal* or *Beak* like Proceſs; at the Root of which, it marching obliquely under the ſeventh *Muſcle* of the Head, and there becomes a round and ſmall Tendon, and appearing again fleſhy, is implanted into the Horns of the *Os Hyoides*, bringing it obliquely downwards.

Annotat.

If you leave this Muſcle in its Origination at the *Levator*, you will find his Beginning perfect; it hath allowed it a double *Venter*, as has its former Companion, that the Jugulars may not be compreſt by it.

This you have at Tab. IX. Fig. I, II. *and at* Tab. X. Fig. I.

Mylohyoideus.

This brings the *Os Hyoides* directly upwards.

THIS hath its Name from the place it has between the lower Jaw, and the *Os Hyoides*, and ariſing laterally fleſhy from the ſaid Nether Jaw, under the *Molares* or *Grinders*, marcheth with a double Set of fleſhy Fibres into the Baſis of the *Os Hyoides* externally, and is to be thrown upwards in Diſſection: *Riolan* gives this at the fulleſt, but it is not decyphered in my Book of *Muſcles*.

Gene-

Geneiohyoideus.

IT's called thus from its ariſing under the *Chin*, and inſerted into the Baſis of the *Os Hyoides*; and by ſome *Anatomiſts* its called *Rectus Attollens*; it being a ſhort, thick and fleſhy Muſcle, ariſing from the inner parts of the Nether Jaw or Chin, and marching downwards, is inſerted into a proper Cavity at the Baſis of the *Os Hyoides* internally, bringing it upwards and forwards, and doth aſſiſt the *Geneioglоſſi* in thruſting forth of the Tongue.

This brings it upwards and forwards.

This you have at Tab. IX. Fig. I, II, III. *and at* Tab. X. Fig. I.

Sternohyoideus.

IT is ſo called, it ariſing from the upper and inner part of the *Sternon*, broad and fleſhy, as moſt *Anatomiſts* allow, under the Skin of the Neck, and carrying all along the ſame breadth and thickneſs, on the *Aſpera Arteria*, and the *Thyroidal* Cartilage of the *Larynx*, it inſerts its ſelf into the Baſis of the *Os Hyoides*, bringing it directly downwards, and ſomewhat backwards.

This brings it downwards & backwards.

This you have at Tab. IX. Fig. I, II. *and at* Tab. X. Fig. I.

Styloglоſſus.

THE *Tongue* hath its name *à Lingendo*, or licking; and altho' it is but ſmall in Bulk, yet it is great in uſe, in that it affords us many advantageous uſes as to our *Speech*, our *Eating*, *Drinking* and *Taſting*; and tho' there is ſcarce any Member in the Body ſo much employed, and ſo continual in uſe as the *Tongue*, yet we ſee there's none more looſe, or more moiſt than it; and as a very convenient Aſſiſtant, in ſending both our Meat and Drink into the Stomach: All which variety of Motions are ſeen to be acted by the Benefit of its Muſcles; and this being one of its Muſcles, has its name from its Origination, it ariſing ſharp, ſmall and fleſhy,

This brings the *Tongue* upwards and inwards.

from the *Styloidal*, or *Pencil* like *Proceſs*, and growing broader and more fleſhy, is inſerted into the middle of the *Tongue*, and draws the *Tongue* upwards and inwards: Its beſt found by diſcovering the *Proceſſus Styloides* with your Fingers, and then your Eye will direct you to it at the ſide of the *Tongue*; in many it is very ſlender, but in Beaſts, it's double, fleſhy and thick.

Annotat.

Uſe. If either of them move, they bring the *Tongue* directly to the right or left ſide; but both moving, they bring it to the *Fauces*.

Hiſtory. *P. Borellus*, Obſ. 17. Cent. 2. tells us of one troubled with a difficulty of Speech, occaſioned by a Tumour ariſing in the Baſis of the *Nether Jaw*; which being examined, there was found a Hardneſs, which hard Swelling being opened, there was taken thence two Stones, one of which was as big as a Walnut, and the other bigger, which being extracted, the Patient ſoon recovered, and the Wound was healed up, only with Barley Water, and *Mel Roſarum.*

This you have at Tab. IX. Fig. XI. *and at* Tab. X. Fig. II.

Ceratogloſſus.

This brings the *Tongue* downwards & inwards.

THIS is called *Ceratogloſſus*, it ariſing fleſhy from the Horns or Bones of the *Os Hyoides*, and is implanted obliquely at the ſides of the *Tongue*, near its Root; if this Pair do both act, they bring the *Tongue* inwards and downwards; if one only works, it brings it to one of its ſides only.

Hiſtory. In the lower part of the Mouth under the Tonge, there has been ſometimes ſeen to grow another Tongue, as it were tyed to it; it not much differing from it, as to it natural Colour, which is alſo ſometimes ſeen to encreaſe in magnitude, ſo as to over reach the Teeth of the *Nether Mandible*, with a kind of a Cleft, dividing the right from the left ſide thereof, carrying in it the likeneſs of a little *Frog*; or as ſome write, making him that is therewith troubled, to croak in his Speech like a *Frog.*

Such a Patient had I once in *Buckinghamſhire*, in the Son of one Mr. *Hall* a Miniſter, who had a very large *Ranula*, which I cured him of, by dividing it from the Teeth with a red hot cutting Inſtrument; and tho' moſt Authors write, that the Humour

TAB. IX

Finis Secundæ prælectionis

Fig. II

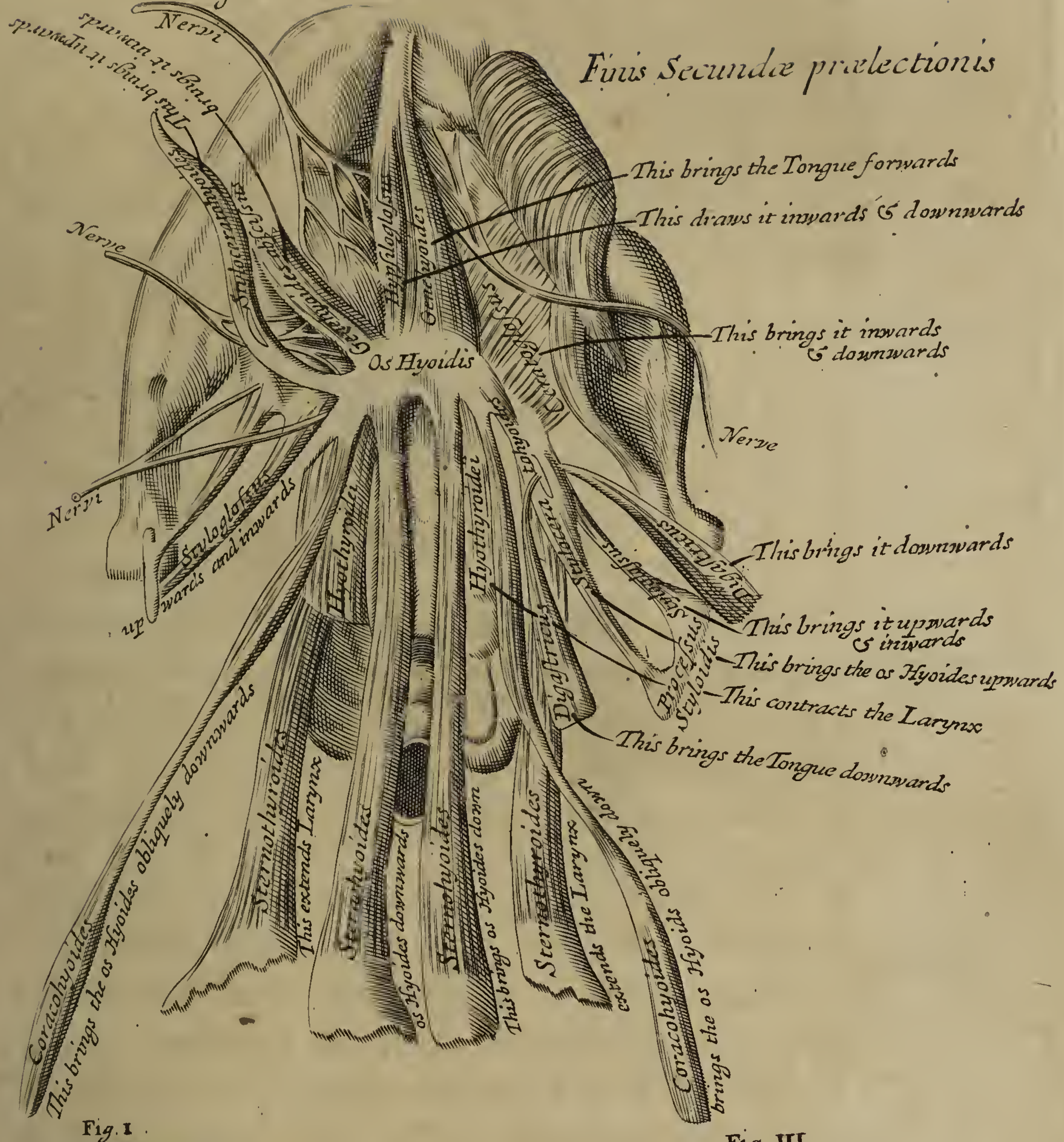


Fig. I

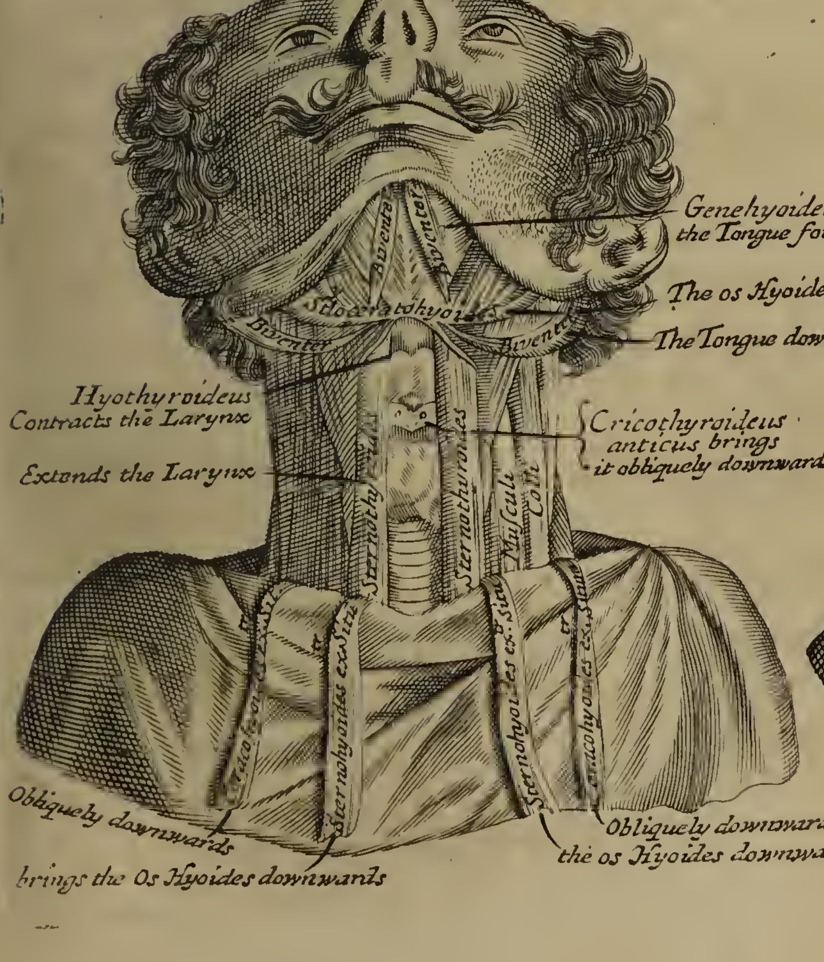
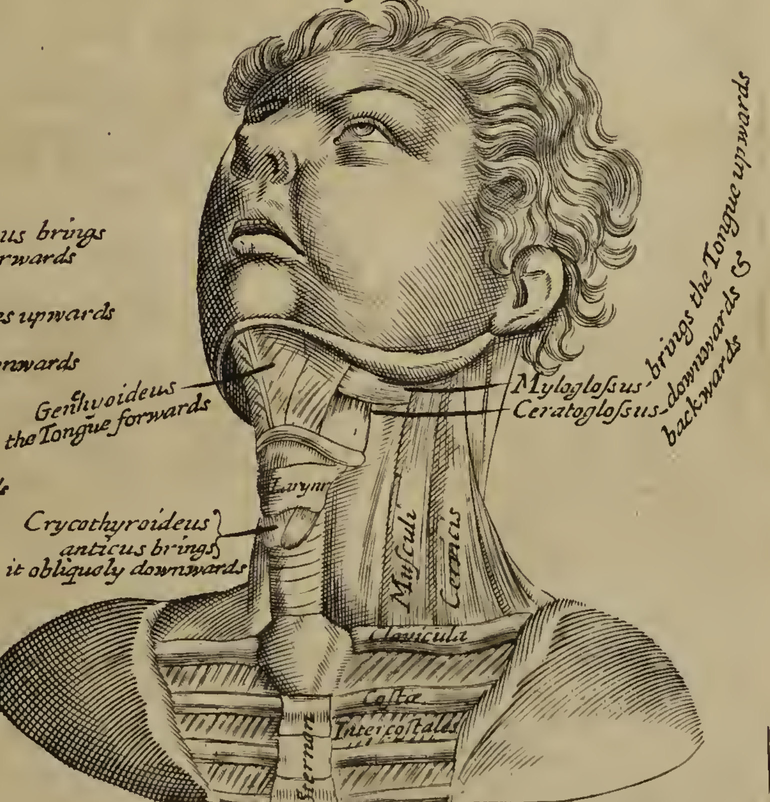


Fig. III


Genhyoideus the Tongue forwards
Myloglosſus
Ceratogloſsus
brings the Tongue upwards downwards & backwards
Larynx
Crycothyroideus anticus brings it obliquoly downwards
Musculi Cervicis
Clavicula
Costæ
Intercostales
Sternum

Humour that is therein contained, is much like the white of an Egg, yet his was as black as Ink, and near half a quarter of a Pint, which was diſcharged thence, all appeared ſo; and tho' he had been once or twice cut before by *Mountebanks*, without any Relief, in that it ſwelled ſuddenly up again; yet I ſo eradicated it on every part by my *Cutting Cautery*, and the *Vitriol Stone*, that there is no Remains left of it, and the Boy holds very well, and is now at *Cambridge*, and ſpeaks better than ever he did in his life.

This you have at Tab. IX. Fig. II, III. *and at* Tab. X. Fig. II.

Geneiogloſſus.

IT's called *Geneiogloſſus*, it ariſing fleſhy, with a narrow Beginning about the middle of the lower Jaw, or Chin; and then enlarging itsſelf, is inſerted into the Root of the *Tongue*; when they both act, they pull the *Tongue* forwards, and at the ſame time thruſt it out of the Mouth: *Veſlingius* takes this for one of the *Muſcles* of the *Os Hyoides*, and writes that it is fixed to its Baſis.

This brings the *Tongue* forwards.

Obſ. 28. *Fab. Hild.* Cent. 1. we read of a Girl falling on the Ground with her *Tongue* hanging out of her Mouth, that the part which was between her *Teeth*, was almoſt cut in pieces by them, and had been wholly bit out, had it not been for the want of two Teeth, which had formerly been drawn out; he once thought to joyn the divided parts of it with Suture, but was prevented by the Girls Impatience, but afterwards cured her by the Method and Medicines, preſcribed by him in that place.

Hiſtory.

This you have at Tab. IX. Fig. II. *and at* Tab. X. Fig. II.

Myloglſſus.

THIS is ſo called, it being a Muſcle ariſing with a broad Beginning, from the innermoſt part of the *Nether Jaw* under the *Molares*, or *Grinders*, and is inſerted into the Ligament of the *Tongue*, which ties its Baſis to the *Fauces*: At the Origination of *Mylohyoideus*, you will exactly find it; and it

This brings the *Tongue* upwards.

Annotat.

it is beſt ſhewn when the *Mandible* is divided: When one of theſe move, the Tongue is turned upwards; if both move, they lift up the Tip towards the Palate or Roof of the mouth.

History. *Riverius* in *Obſ.* 381. tells us of one troubled with the *Pox*, who being cured with *Mercury*, the *Apothecary* keeping him longer in his Flux, than the Dr. ordered, the extream Violence of the Flux had ſo ſwelled his *Tongue*, that it hung the breadth of four Fingers out of his Mouth; for the Remedy of which, the Dr. would not adviſe any thing, tho' the Patient continued in this miſerable Condition, for the Space of four Months; and the *Tongue* being altered by the Air, was grown three Fingers thick; another Phyſician being ſent for, after bleeding him, and other things there preſcribed for him, his *Tongue* grew ſofter, and the Tumour diſcuſt, and the *Tongue* brought to its former Habit.

This you have at Tab. IX. Fig. III. *and at* Tab. X. Fig. II.

Hypſilogloſſus, or *Baſiogloſſus.*

This draws it inwards & downwards.

THE firſt Name it hath, on its ariſing fleſhy from the Baſis of the *Os Hyoides*, and by ſome alſo called *Hypſiloides* from its Figure it bears with a Greek U, and *Baſiogloſſus*, it ariſing from its Baſis, and ending in the middle of the Tongue; this being generally allowed to bring the Tongue inwards, and at the ſame time ſaid alſo to draw it backwards.

This you have at Tab. IX. Fig. II. *and at* Tab. X. Fig. II.

Lingualis.

This moves the *Tongue* both in Conſtriction and Dilatation.

IT has its Name, it ariſing large and fleſhy from the Baſis of the *Os Hyoides*, and runs forward to the Tip of the *Tongue*, and at this day it is diſputable whether it be a *Muſcle* or not: But *Spigelius* gives it this uſe, that its Tranſverſe Fibres do thicken, and as it were, conſtringe it; and that by its oblique Fibres it is dilated, and that its right Fibres were formed for bringing it towards the Palate.

There is no Deſcription of this Muſcle.

The *Stylopharyngæus*, and the *Stylogloſſus*, participating one and the ſame Origin in the *Proceſſus Styloides*, have different Contractions in reference to their various Terminations; the firſt being inſerted into the inſide of the Glandulous Coat of the *Fauces*, do lift them up, and expands the Mouth of the Gulet; but the *Styloglossus* implanted into the Root of the Tongue, lifts it up towards the Palate; and the third *Styloideus* being inſerted into the Horns of the *Os Hyoides*, elevates it, and the Root of the Tongue faſtned to it; the Actions of the Swallowing Muſcles with their Origins and Inſertions, being thus premiſed, Deglutitions and their main Uſes is thus celebrated: The *Styloglossus* lifting up the *Tip* and Blade of the *Tongue* towards the Arch of the Palate, therewith throweth the Maſticated Meat (embodyed with *Salival Liquor*) upon the *Epiglottis*, preſſing it down, and thruſting it ſo cloſe, that no part of the Meat or Drink can enter into the *Aſpera Arteria*; and the *Styloideus* lifting up the Root of the *Tongue*, puts the Aliment beyond the *Epiglottis*, near the Entrance of the *Oeſophagus*, and at the ſame inſtant the *Pterygopharyngæus*, or as others *Sphænopharyngeus*, ariſing out of the *Aliform Proceſſes* of the *Os Sphænoides*, from whence it gets its laſt Name, and is inſerted into the back part of the Glandulous Coat covering the *Fauces*, which this Muſcle embraces with Semicircular Fibres, and bringing the arched *Fauces* to a plain, and by ſtraightning the Paſſage of the *Throat* by their nearer approaches to each other, whereupon the compreſſed Aliment is puſhed into the Orifice of the Gulet, and forthwith the *Muſculi Oeſophagei*, ariſing out of the ſides of the *Bucklar Cartilage*, do encircle the *Oeſophagus inſtar Vaginæ*, whence they are called *Vaginales*, beſet in the outſide with oblong Fibres, contracting the *Oeſophagus* longways, and more inwardly with Annular Fibres, ſtreightning the Gulet in depth, circularly, and throw the Aliment into the left Orifice of the Ventricle, wherein by diverſe Ferments, inſinuating themſelves into the Compage of the Aliment, and enlarging its Pores, doth colliquate and diſſolve it, extracting an albeſcent Liquor, which we commonly call Chile, as Dr. *Collins* learnedly obſerves.

Maſtoideus.

This contracts the *Neck.*

THE Syſtem of *Spinal Vertebres* may properly be termed a Chain made up of two extream parts, each part being formed of many *Links* curiouſly put together, by the interpoſition of ſtrong Ligaments, whoſe Union is ſcarcely diviſable; their Sinews being well fitted to the Heads of the *Occiput*, whereunto they are ſo firmly affixed in their proper Cavities, that they cannot readily ſtart out by the moving of the Head, which are brought forward in flexure on the firſt *Vertebre* of the Neck, by theſe pair of *Muſcles*; and being long thick Muſcles, ariſing partly out of the *Top* of the *Sternon*, and partly out of the *Clavicle*, and obliquely aſcending by the Neck, are inſerted into the *Proceſſus Mammiformes*, which being contracted, do draw the Head forwards, pulling the Chin towards the upper part of the *Sternon.* Theſe in aged People are very conſpicuous, and plainly apparent.

Obſervat.

Petrus Foreſt. tells us of a *Struma* in the Neck, growing to the largeneſs of an Egg, which being cut by a Sword, and ſtricktly examined by his Father, and by another Nobleman, it was ſeen filled with living Lice; the Man having this *Struma* in his Neck for a long time, no Chyrurgeon would undertake to cure him, he being poor and wounded, and requiring the preſent Help of a Chyrurgeon, one upon Charity, and by chance, coming to cure his Wound, with it alſo cured his Evil Swelling. This is the Muſcle uſually cut in curing of *Wry-Necks.*

This you have at Tab. VIII. Fig. III.

Lect. III.

Lecture III.

Having theſe following *MUSCLES* belonging to it, *viz.*

Hyothyroides,
Sternothyroides,
Crycothyroides,
Crycoarytænoides Lateralis,
Thyroarytænoides,
Crycoaritænoides Poſticus,
Arytænoides,
Stylopharyngæus,
Sphænopharyngæus,
Cephalopharyngæus,
Oeſophagæus,
Sphænopalatinus,
Pterygopalatinus,
Obliquus Major cum Trochleâ,
Obliquus Minor,
Elevator
Depreſſor
Abductor } *Oculi,*
Adductor

Laxator Externus,
Tenſor Internus Tympani,
Longus,
Scalenus,
Serratus Major
Serratus Minor } *Anticus,*
Subclavius,
Intercoſtales Externi,
Intercoſtales Interni,
Triangularis,
Diaphragma,
Cor,
Detruſor Urinæ,
Sphincter Veſicæ,
Sphincter Ani,
Levatores Ani.

Hyothyroides.

This contracts the *Larynx*, and brings it upwards.

THE *Larynx* is the Head of the *Wind-pipe*, and an Inſtrument made for Modulating of the Voice, it being an admirable Piece of *Art*, framed by the *Alwiſe Architect* for that Uſe, and a Compage framed out of ſeveral diſtinct parts, as *Membranes*, *Cartilages*, *Veſſels* and *Muſcles*: This among the reſt, taking its Name from its Origin, it ariſing fleſhy from the whole ſides of the *Os Hyoides* at its Baſis, and marching along with right Fibres, is inſerted into the lowermoſt and lateral part of the *Buckler Cartilage*; and by raiſing it, does dilate its Cleft: Upon your raiſing this *Muſcle* clear from its Origination and Inſertion, you will with eaſe find out all the other Muſcles belonging to the *Larynx*; and

Annotat.

as an Obſervation hereof, when we would raiſe, or form a ſharp Voice, we are uſually ſeen to bring our *Larynx* upwards.

Obſervat. This *Muſcle* being contracted by attolling the *Larynx*, is ſaid to force the Nutriment towards the Entrance of the *Gulet*, in its Order to Deglutition, which in its Journey is facilitated by the *Epiglottis*, cloſing the Head of the *Wind-pipe*, for hindring the falling of the Nutriment into its Cavity, in its Paſſage over it.

As an Obſervation on this part, it has been many times taken Notice of, this part being wounded, that thoſe who have loſt their Speech thereupon, have alſo loſt their Taſting; and it is reported of *William Prince* of *Aurange*, upon his receiving a Wound in his Neck, he loſt his Taſte; and of another, being wounded in the *French Wars*, died *Dumb*; and this may reaſonably follow hence, in that there is ſeen a pair of Nerves ariſing from the third Conjugation, inſerted into the *Larynx*, by one Branch, of which the *Tongue* is made the Maſter of Speech, by the other we obtain our Senſe of Taſting; and therefore when any one of them be divided, that part muſt neceſſarily loſe its proper Energy, as *Bodinus* well obſerves in *Theatr. Natur.* lib. 4. pag. 46.

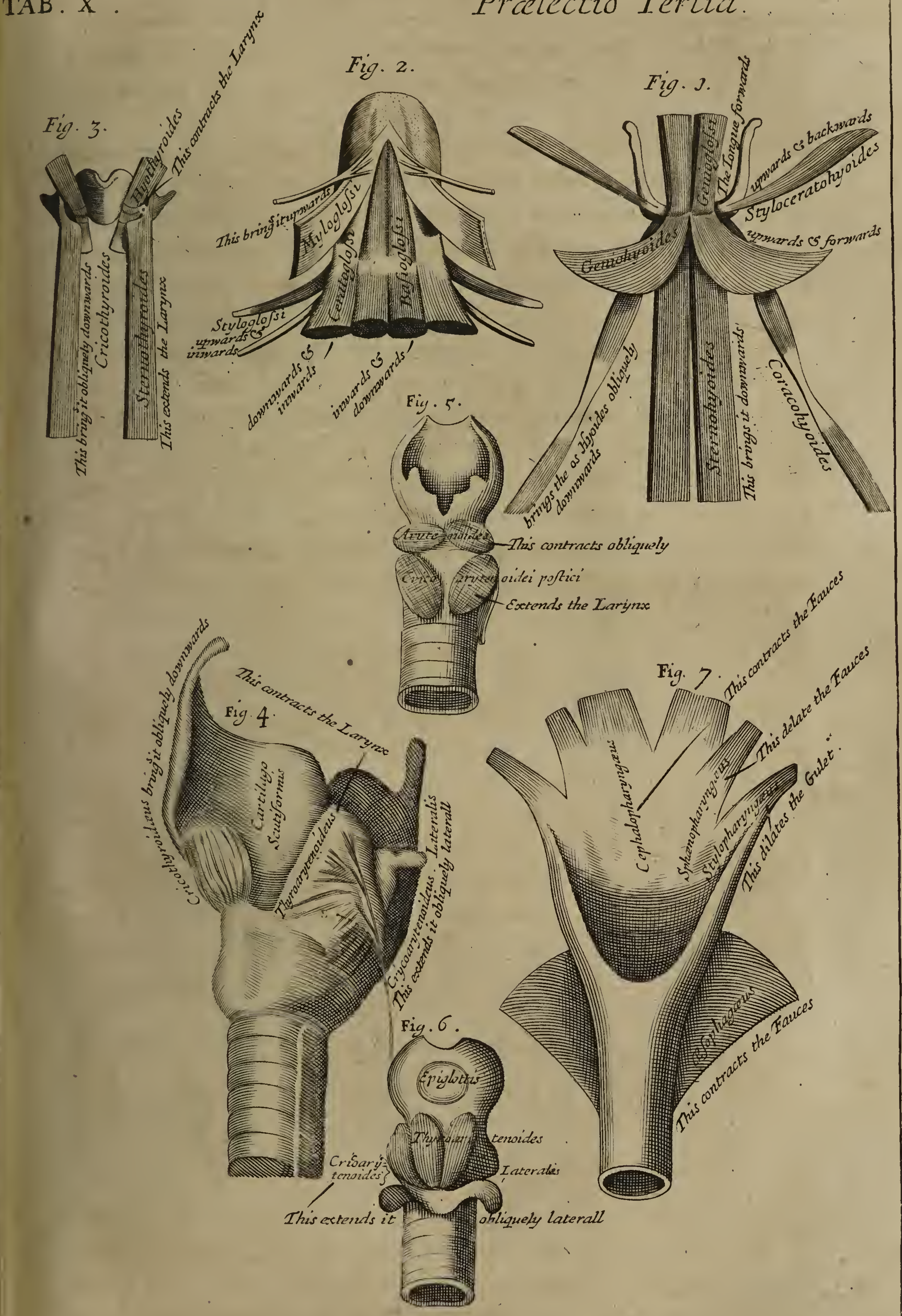
Amatus Luſitanus, Cent. 2. *Curat.* tells us of a Woman troubled with the *Evil* in her Neck, who putting her ſelf under the Hands of a *Quack*, who having applyed many Medicines in vain, he dreſt her afterwards with *Sublimate*, in hopes of eradicating it, by which one of the recurrent Nerves of her Breaſt (which makes the Voice) was eaten away; upon which ſhe not only became hoarſe, but loſt her Voice, wholly thereby.

This you have at Tab. IX. Fig. I, II, *and at* Tab. X. Fig. III.

Sternothyroides.

This extends the *Larynx*, and brings it downwards.

THIS hath its Name, by its ariſing fleſhy and broad from the upper and inner part of the *Sternon*; and keeping his Dimenſions, is ſeen to creep up with ſtrait Fibres along the *Wind-pipe*, and is inſerted into the lower part of the *Buckler Cartilage*; and having preſt it, does narrow its Cleft: This and its Partner working together, do draw down the *Larynx*, TAB. X . *Prælectio Tertia* .



by lengthning the Pipe, and do cloſe up its Cleft.

Hiſtory.

Columbus, lib. 1. cap. 13. *Anatom.* writes, that in many of his Diſſections, he has found the humane *Larynx* wholly Oſſeal, which in Youth was cartilaginous; and *Coiter*, lib. Obſ. writes of a Malefactor twice hang'd, and yet recovered, and came to life again, as if by a Miracle; and being the third time executed by the Command of Juſtice, till dead; upon opening him, his Wind-pipe was found wholly Oſſeal; and he writes of another, who had both his *Larynx* and his *Wind-pipe* turned into ſpongy Bones.

This you have at Tab. IX. Fig. I, II. *and at* Tab. X. Fig. III.

Crycothyroides.

This brings the *Cartilage* obliquely downwards.

THIS is ſo called, it being a ſhort, thin and fleſhy Muſcle, upon its ariſing from the Forepart of the *Cricois*, or annular Cartilage, and ending at the ſides of the *Scutiformis*, or *Buckler Cartilage*; and by ſome it is called *Crycothyroideus Anticus*, from its Origination, and is thought to bring the *Cartilage* ſomewhat obliquely downwards, it ariſing in the fore and lower parts of the *Larynx*.

Its uſe.

When it is contracted, it extends the Annular Cartilage, and opens the Cleft for making a more grave, and deep voice.

Hiſtory.

Albucaſis cap. 94. Chir. tells us of one, who having a ſpiked Arrow ſhot into the Throat, which was not to be cut out, nor by the Applications of proper Inſtruments drawn thence, yet beyond the Expectation of many, nay, and of himſelf alſo, the Patient recovered.

This you have at Tab. IX. Fig. I. *and at* Tab. XI. Fig. III, IV. *and at* Tab. XIII. Fig. II.

Crycoarytænoides Lateralis.

This extends it obliquely laterall.

THIS hath its Name (being a ſhort, ſmall and fleſhy *Muſcle*) upon its riſing at the ſides of the lower part of the *Cricoidal* or Annular *Cartilage*; and being in its oblique Aſcent, is inſerted to the outſide of the *Arytænois*, or *Ewer-like Cartilage* laterally, not far off from the former, it opening the *Larynx*, by the oblique Deduction of its Cartilages.

Hiſtory. *Joh. Bauhine de Obſ. Prop.* writes, that he opened a Boy, whoſe *Larynx* was wholly cut thro', and almoſt all his Gulet, who lived ſeven days without Meat, and whatever he took, went through his Wound, thro' which alſo he breathed; and upon opening his left Kidney, the Emulgent Vein was ſeen divided into three parts, the firſt entring the Kidneys, and the other the Arteries of the ſame ſide, and his *Vena Azygos* was with its Branches ſent to the ſecond Rib.

As a further Obſervation of this Muſcle, we may take Notice, that by how much the ſecond pair of Flexors do bring the Cartilage to a Cloſure, the other pair of Extenſors do bring it outwards, and open it.

This you have at Tab. X. Fig. IV. *and* Fig. VI.

Thyroaritænoides.

This Contracts it. THIS hath its name from *Thyros*, or *Scrutiformis*, and *Arytænois Guttalis*, it being a fleſhy and broad Muſcle, and the largeſt of all the proper Muſcles of the *Larynx*, and is tranſverſly planted into the Cavity thereof, and being carried upwards lengthways, is implanted at the Fore parts of the *Ewer-like Cartilage*, which makes the *Glottis*, which by conſtringing, it ſhuts the *Larynx*.

Obſervat. This Muſcle is beſt found out, by dividing the *Buckler* like *Cartilage*, from the Annular, and *Ewer-like* Cartilages, and ſubjacent Muſcles, the Coats of them being carefully preſerved, after which this will plainly ſhew its ſelf.

That the Cartilages of the Wind-pipe in all, or in moſt Bodies ſhould turn Oſſeal, is beyond my Belief, but that ſometimes it ſo falls out, has been perfectly ſhewn; and I remember I have ſeen in ſome old men, both their *Larynxes* and their *Muſcles* ſo attenuated, as if they were even dryed up, and made excarneal, ſo as that ſome of their Diet is ſeen eaſily to fall into the Wind-pipe.

Hiſtory. *Cl. Oſvald. Gabelchover de Obſ. ſuis*, writes, of an old Man of above threeſcore Years of Age, who had the Misfortune, not to ſwallow any Drink, but a great part of it would fall into his Wind pipe; he could ſwallow his Meat well enough without any Offence to him, eſpecially that which was not friable, which by degrees conſumed and waſted.

This you have at Tab. X. Fig. IV, V.

Crycoarytænoides Poſticus.

This extends the *Larynx.*

IT's ſo named, upon its ariſing from the back part of the *Cricois*, or *Annular Cartilage*, and being implanted into the lower part of the *Aritænois*, or *Ewer-like Cartilage* : By *Caſſerius*, it is called *Par Cucullare*, it bordering upon the back part of the *Larynx*, it being much of a *Quadrangular* Figure, it ariſing fleſhy from the back part of the *Cricois*, and marching obliquely upwards, filling its Cavity with its Fibres, is implanted in the lower part of the *Ewer-like Cartilage*, and by dividing the Cartilages, does open the *Larynx*.

Annotat.

This is ſaid to extend the *Ewer-like* Cartilage; and by bringing it backwards to the outward parts, does open the *Epiglott*, which is eaſily ſhewn, upon turning the Muſcle back with your Knife, where you will plainly ſee the *Ewer-like Cartilage* readily open upon it.

Obſervat.

I knew one Mr. *Goodman*, a Schoolmaſter in *Norfolk*, about forty years of Age, who could eat his Meat very heartily without any Diſturbance, but when he had occaſion to drink, was forced to bend himſelf forwards, and let his Liquor down very ſlowly and ſparingly, leaſt any of it ſhould fall into his Wind-pipe, as have ſometimes hapned to him beyond all his Care, and have given him no ſmall Trouble or Danger of Suffocation; I ſaw the ſame Caſe alſo in the Earl of *Arglaſs*.

This you have at Tab. X. Fig. V.

Arytænoides.

This obliquely contracts it.

IT hath its Name, it being a very ſmall and fleſhy *Muſcle*, ariſing with oblique fleſhy Fibres from the *Arytænois*, or *Ewer-like Cartilage*, and joyning its ſelf to the *Annular Cartilage*, inſerts its ſelf into it, they ſeeming to joyn themſelves together.

R This

This obliquely moves the *Ewer-like Cartilage* to either ſide, and by conſtringing its Baſis, does ſhut the *Glottis.*

Uſe. Its Action is very obſervable, *viz.* when we for ſome time forceably ſtop our Breath, we intercept the Motion of the Muſcles of the *Trunk*, whoſe Uſe is employed in *Expiration.*

Obſervat. *Mercellus Donatus*, *Hiſt. Mirab.* lib. 3. cap. 7. writes of a *Noble-woman*, who taking ſome Pills, one of them by chance fell into her *Wind-pipe*, which remaining there for near three hours, gave her great Pain, and Danger of Suffocation, and which was not to be drawn out with the greateſt Skill whatever, until at length, by growing moiſt, it was coughed up by piece-meal, and ſo diſcharged her from her great Anguiſh of Mind, and Torment of Body, nay from Death its ſelf, which ſhe hourly expected.

An Annotation upon the MUSCLE *Arytænoides, given me by the Worthy* Dr. Connor.

" The Action of this Muſcle ſolves that famous Queſtion, " whether Reſpiration be a voluntary or involuntary Moti- " on, or whether partly one, and the other; 'tis plain, we " can ſtop our Breath when we pleaſe, and it is very evident, " that the Motion of Reſpiration goes on ſpontaneouſly when " we are aſleep; from whence all our *Anatomiſts* conclude, " that Reſpiration is both a voluntary, and an involuntary " Action: Dr. *Willis* went a ſtep further, and explains how " this Motion is involuntary, becauſe ſaith he, the *Intercoſtal* " *Muſcles* receive their *Nerves* from the *Cerebellum*, which *Nerves* " he ſuppoſeth all to ſerve for involuntary Motions; which " in my Opinion muſt be a Miſtake, for there are ſeveral " Nerves, that come from the *Cerebellum*, even Branches of " the fifth Pair, (which with the eight Pair, make the *Intercoſtal* " *Nerves* that cauſe Reſpiration) which ſerve for voluntary " Actions, as are the Branches of the 5th. 6th. and 8th. pair " which voluntarily do move the *Eye*, the *Tongue*, the *Larynx*, *Pha-* " *rynx*, the Muſcles of the *Neck*, and thoſe of the Lower " Mandible; from whence it is evident, that Reſpiration is " not involuntary, as our Moderns would have it, becauſe it " is performed by Nerves, which come from the *Cerebell*: " Since it would follow from thence, that all the Muſcular " parts that receive *Nerves* from the *Cerebellum*, ſhould be in a " conſtant involuntary Action, as the *Heart*, and the *Intercoſtal*

" *Muſcles* are: But I would rather, as I have in my Account " of *Muſcular Motion*, derive the Involuntarineſs of the Motion " of the *Intercoſtal Muſcles*, from their want of true *Antagoniſts*: " Now the Reaſon why theſe Muſcles can voluntarily ſtop, " is not becauſe they are of themſelves, ſubject to any involuntary Motion, for the ſelf-ſame Muſcle can never be " ſubject to voluntary, and involuntary *Action* at the ſame " time; but becauſe the Muſcle *Arytænoides*, which ſhuts the " Paſſage of the *Air* into the *Lungs*, can be at our free Will " contracted, and can cloſe the *Larynx*, that the *Air*, tho' " preſſed by the Muſcles of the *Breaſt*, which are always in " this involuntary *Motion*, cannot get into the *Lungs*, from " whence Reſpiration voluntarily ceaſes for a time, ſo that " I may in ſome reſpect call the *Muſcle Arytænoides* contracted, " and the ambient *Air* intercepted the *Antagoniſts* of the *Muſcles* of Reſpiration; as I may in a manner call the Blood " that dilates the Heart, the *Antagoniſt* of the Heart it ſelf, " the Hearts own *Muſcular Motion* being ſelf-contraction.

This you have at Tab. X. Fig. I.

Stylopharyngæus.

This dilates the *Gulet*.

NAture hath made the *Gulet*, as a concave Body, and a Repoſitory for entertaining our Nutriment, the only proper Conveyance for the carrying and diſpatching of our Aliment from the Mouth, into the Stomach; as the Head of the *Wind-pipe* is called the *Larynx*, ſo the Head of this is named the *Pharynx*; its ſeen to march along at the backſide of the Wind-pipe, for its more eaſy diſcharge of its Nutriment thro' it, which it performs by the Benefit of the *Muſcles* allowed it, of which this is accounted one of the third Pair, and hath this name allowed it, upon its ariſing with a ſharp and fleſhy Beginning from the inward part of the *Styloidal*, or *Beak-like Proceſs*; and with its thin Body obliquely deſcending, it expands its ſelf at the Termination of the former. This Pair acting, as *Veſlingius* and other *Anatomiſts* write, do bring the *Fauces* upwards, and dilate them, and are ſaid alſo to enlarge the Cavity of the *Gulet*; others on the contrary affirming, that this is a *Conſtrictor*.

Hiſtory. *Wierus* writes of one, who took a whole Egg, and got it into his Gulet, but it ſticking ſo cloſe to the upper part thereof that it could not be got out, and denying all Paſſage, and preſſing too hard upon the Wind-pipe, the Man became preſently ſuffocated and dyed.

This you have at Tab. X. Fig. VII. *and at* Tab. XIII. Fig. I.

Sphænopharingæus.

This dilates the *Fauces*. THIS is one of the ſecond Pair, and from its ariſing near the *Appendix* of the *Sphænoides*, or *Wedge-like Bone*, both thin and nervous, it has this Name given it; and falling down by the inner Cavity of the *Pterygoides*, it is inſerted by a ſmall Tendon into the skinny part of the Palate, from whence the *Gargareon* ſeems to ariſe, and is allowed to dilate the *Fauces*.

Annotat. Neither this or its Partner is to be ſhewn without much Difficulty, and to find them, after you have raiſed the *Larynx*, and the *Oeſophagus*, leave the *Fauces* entire, then divide the *Fauces* themſelves from the *Os Palati*, till you arrive at the Cavity, then carry your Knife cloſe inwards to the *Os Cuneiforme*; and when it is thus divided, you will meet with both their Originations, which you may raiſe with great eaſe.

Hiſtory. It's a Maxim allowed among the *Ancients*, if any one ſwallows a Pin or Needle, or any other ſuch like ſharp pointed thing; if in theſe Caſes they ſhould preſcribe either *Vomits*, or *Diureticks*, they know not but hereby (whilſt they by endeavouring to remove them from their place) they may drive them ſo as to fix them into ſome other part more ſenſible than that, where they were firſt lodged in, and hereby create great Danger; ſuch Cures therefore are not to be undertaken by them, where neither *Art* or *Hopes* can give them any Encouragement thereto, unleſs Providence its ſelf works ſome ſtrange Interpoſition of ſupplying them with Help, or *Nature*, (as ſometimes is ſeen has thrown them out by convenient Paſſages without any Injuries to the parts, as has been ſeen by opening of an *Abſceſs*) or by *Stool*, or by *Urine*; where it is wonderful to ſee how theſe ſharp pointed Inſtruments, as *Needles*, and the like, ſhould paſs through the *Stomach* and *Guts*, the *Meſa-*

Meſaraic Veſſels, the *Porta*, the *Liver*, the *Vena Cava*, the *Emulgent Veins*, the *Kidneys*, the *Ureters*, and the *Bladder*, and all this in a ſmall Space of time, as if the Needle its ſelf, or the like, ſought out its own way for its Diſcharge out of the Body, through all theſe Stages and Circuits thus planted in Humane Body, through which it muſt paſs.

This you have at Tab. X. Fig. VII. *and at* Tab. XIII. Fig. I.

Cephalopharyngæus.

This Contracts the *Fauces.*

THIS *Muſcle* ariſing from the *Cranium*, and the firſt Vertebre of the *Neck*, where they are joyned, gives it the firſt part of its Name, and in its Deſcent, it being Inſerted into the ſides of the *Os Hyoides*, and *Buckler Cartilage*, and the beginning of the *Oeſophagus*, or *Pharynx*, gives it the other part thereof, whence he ſeems to borrow his Coat, and by lifting it up, doth at the ſame time conſtringe the *Fauces* in deglutition.

Obſervat.

Tho. à Vega Cap 3. Lib. 6. Loc. affect. writes, That by a Reſolution of theſe *Muſcles*, ſome have of a ſudden grown ſick, and dy'd.

Hiſtory.

Benedictus Bonacurtius a *Medico-Chirurgeon*, writes, He Cured one in Priſon, who with a Knife had ſo Cut his Throat, and made ſo large a Wound therein, that both his Victuals, and his Medicines which he took, came all thro' it, and yet the Man received a perfect Cure in few days.

This is to be ſhewn at Tab. X. Fig. II. *and at* Tab XIII. Fig. I.

Oeſophagæus, or *Sphincter Gulæ.*

This Contracts the *Fauces.*

IT has its firſt Name from its Situation *Oeſophagus*, or *Gulet*, and *Sphincter* from σφίγγω, *Stringo*, to girt cloſe: This is a fleſhy and broad *Muſcle*, encircling the *Gulet*, it taking its Origination from each ſide of the *Buckler Cartilage*, and afterwards gives a ſoft fleſhy covering to it; 'tis allow'd to contract its Cavity, and at the ſame time to ſend the Aliment forwards in its paſſage into the Stomack.

Obſervat.

We read a very unuſual Caſe in *Fol.* 42. *Fabric. Hildan.*

Cent. I. of a Souldier who being wounded with a *Bullet*, which paſt into his Trunk; three or four Months after his Cure, a fragment of a *Rib*, pritty thick, and 3 fingers in length, was thrown out by his Wind-pipe, and yet did well, and had no Symptoms followed, as *Peter Pigray* Recites it.

Obſ. 32. *Tab. Hildan. Cent.* I. we read of one who having ſwallow'd a *Sharp-bone* into her *Throat*, who being many times provoked to vomit for three days ſucceſſively, yet could neither get the Bone up or down: He being call'd for the fourth day, found her Neck both inwards and outwards much ſwell'd and inflam'd, ſo that ſhe could ſcarce breath; beſides, ſhe was ſeiz'd with vehement *Pain*, *Feaver*, *Delirium*, and *Convulſions*; and when neither by *Vomitting*, or *Inſtruments*, 'twas to be removed, an *Abſceſs* did ariſe in her *Throat*, which by his Medicines there made uſe of, both inward and outward, he eaſed her Pain, and brought the Abſceſs to Suppuration; which breaking, a good quantity of Matter came out of her Mouth, and with it ſhe diſcharged the Bone, and in a ſhort time after recovered.

This you have at Tab. X. Fig. VII. *and at* Tab. XIII. Fig. I.

Sphænopalatinus.

This attols the *Palate*, & brings it backwards.

MAN hath conſigned to his upper Palace, a curious Portal, finely wrought within, for the more advantagious tuning of his Voice, and helping his Tongue in the articulating of Letters, as alſo for the more ready indulging his Palate, in eaten ſavoury Meats, and drinking pleaſant Liquors, and as it hath allowed it variety of parts, ſo hath it theſe two pair of *Muſcles* granted to it, which the late Learned Dr. *Croun* named *Spænopalatinus*, and *Pterygopalatinus*: This having its name upon its ariſing from the *Os Sphænoides*, or Wedge-like Bone, and inſerting its ſelf with a broad Tendon into the ſides of the *Glandula Palati*, where it becoming a round fleſhy Belly, and afterwards leſſening its ſelf near its Inſertion, carries on the ſame Body to the back part of the *Gargareon*.

Obſervat.

From the Situation and Action of theſe *Muſcles*, with the *Pterygopalatini* may ſome Account be given, how the *Uvala* being relaxt, is ſo eaſily reduced, by thruſting the *Thumb* bent towards the Palate, or theſe *Muſcles*.

Valeſcus, cap. 5. lib. 3. *Philon.* writes, That he was called to a Perſon troubled with an Apoſtem in his *Uvala*, and upon ſeeing his Caſe, he promiſed to deal with him according to Art; another Elder in his abſence came to him, and cut off all his *Uvala* with his Sciſſers; which being done, the man being of a plethoric Conſtitution, ſuch a quantity of Blood and Humour diſcharged its ſelf into his Breſt, that it made ſuch an Obſtruction and Preſſure on his Breſt and Lungs, that he could ſcarce breath; and after this could ſcarce ſpit, or cleanſe his Breſt, but the third day he died ſuffocated. History.

This you have at Tab. VIII. Fig. II.

Pterygopalatinus.

This brings the *Uvala* downwards.

THIS *Muſcle* by ſome is called *Sphænopterygopalatinus*, it ariſing like the former from the *Os Sphænoides*, or Wedge-like Bone, and inſerting its ſelf into the inner Cavity of the *Os Pterygoides*, or the ſaid Bone, (both which Names are given to the ſame Bone) where its Tendon ſeems to terminate, it firſt running over a part of the forementioned Bone, and then is ſeen to inſert its ſelf at the Fore-part of the Palate, whence it naturally hath the other Name allowed it.

Altho' in the laſt Deſcription, we read of one dying ſuffocated, by having his *Uvala* cut in Pieces; yet I can tell the Reader, we live in an age, where very few parts of the Body has been more ill treated, than this of the *Palate*, eſpecially in venereal Caſes, where I have many times ſeen it eat away with the *Uvala* in the *French Pox*; and tho' I have known many troubled with this Diſeaſe, who have been ſo hoarſe, that you can ſcarce tell what they ſay, and ſo rotten, and eaten up with ſtinking Ulcers, that they are the Subjects more of Shame than of Pity; yet many of theſe, by the help of a ſilver Palate, fitted to the Ulcer that has been eat thro', and kept up by a piece of a Sponge let into its back part thro' two Holes, it has been ſeen there kept ſo tite, that it has altered their Voice to a ſtrange degree, and they have ſpoke ſo well, as if they had not loſt any of their *Palate*. Annotat.

This you have at Tab. VIII. Fig II.

Obliquus Major cum Trochleâ, or *Muſculo Trochleari*, Or the *Eyes Greater Oblique Muſcle* with its *Pulley*.

This brings the *Eye* inwards.

THE *Eye*, that Globular or Spherical Body, planted in a concave Valley in the *Front*, for ſecuring us in our Actings and Conduct, as well as bringing us into the Knowledge both of Men and Matters, is a Syſtem made of many parts, having a dependance on each other, either of which are ſeen to pay their various Tribute to this Noble Member, for the better ſecuring of our Sight: I ſhall not enlarge any more upon this part, but only ſhew the *Muſcles* allowed it, beginning with this, where we may ſee it has three Names allowed it by Authors, it being called *Obliquus*, from its Poſition, *Trochlearis*, from its cartilaginous Pulley through which it paſſeth, and *Longiſſimus*, from its length, being conſidered with the other Muſcles of the *Eye*. Now, ſince this *Muſcle* being both longer, and ſeated above the other, hath the ſame Origination with the third right *Muſcle*, it getting its thin Body into a Cartilagenous Pulley; which being made ſharp and fleſhy, does obliquely march thro' it, to the upper part of the *Eye*, and ends near the Tendon of the *Obliquus Minor*; and being aſſiſted with this Pulley, does turn the *Eye* obliquely inwards, towards its inner Corner or *Canthus*.

Uſe.

This *Muſcle* by ſome is called *Amatorius*, the Lovers, or *Ogleing Muſcle*, from the rowling Uſe, Lovers make of it with their Miſtreſſes; ſeveral Fibres are allowed to paſs from the *Perioſtium*, to the fore-mentined *Trochlea*, which according to the Opinion of ſome *Anatomiſts*, were made on purpoſe for forming of this *Trochlea*, tho' the Uſe of them ſeems rather deſigned for a more ſteady fixing of the *Trochlea*, than any *Muſcular Motion*.

Hiſtory.

P. Borellus, Obſ. 63. Cent. 2. writes, That he ſaw in two Men, Eyes of various Colours, one of which was blewiſh, and the other black, and that *D. Formius* a *Farrier* of *Montpelier* affirmed to him, he ſaw a Boy, in the *Iris* of whoſe *Eye*, theſe *French* Words were fairly to be read, *Love ſoit Dieu*; in Latine, *Laudatus ſit Deus*; *Anglicè*, *God be Praiſed*.

This you have at Tab. IX. Fig. III. V.

Fig. I.

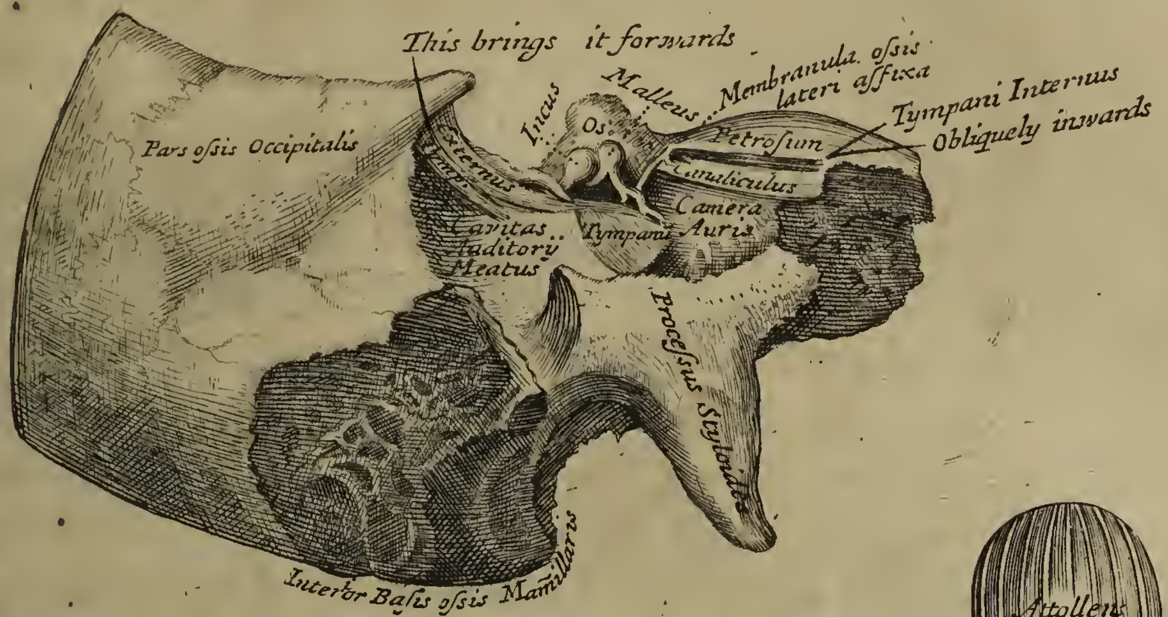


Fig. III.

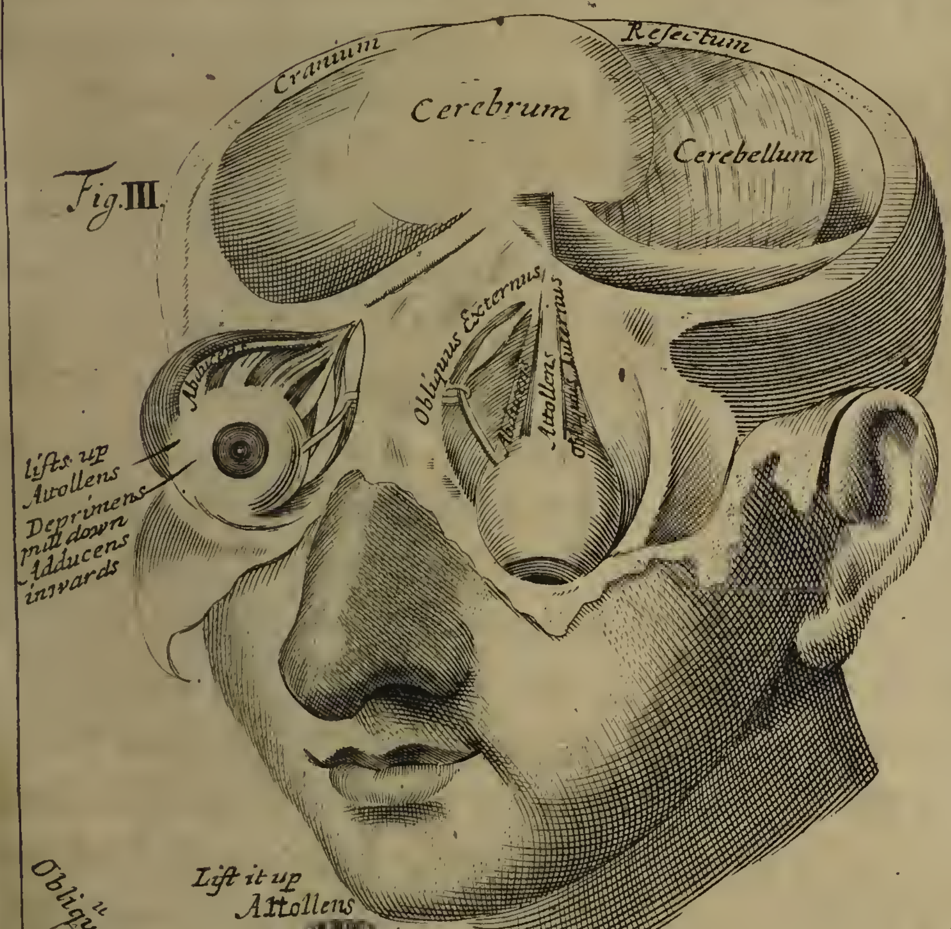


Fig. IIII.

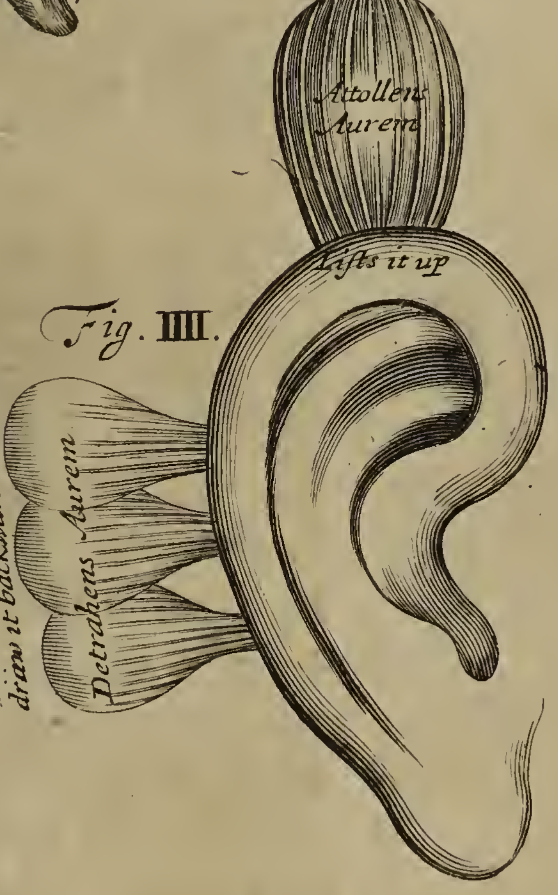


Fig. V.

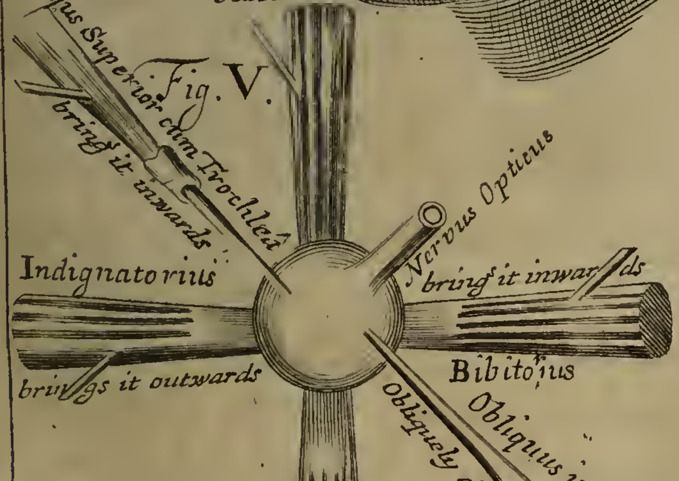
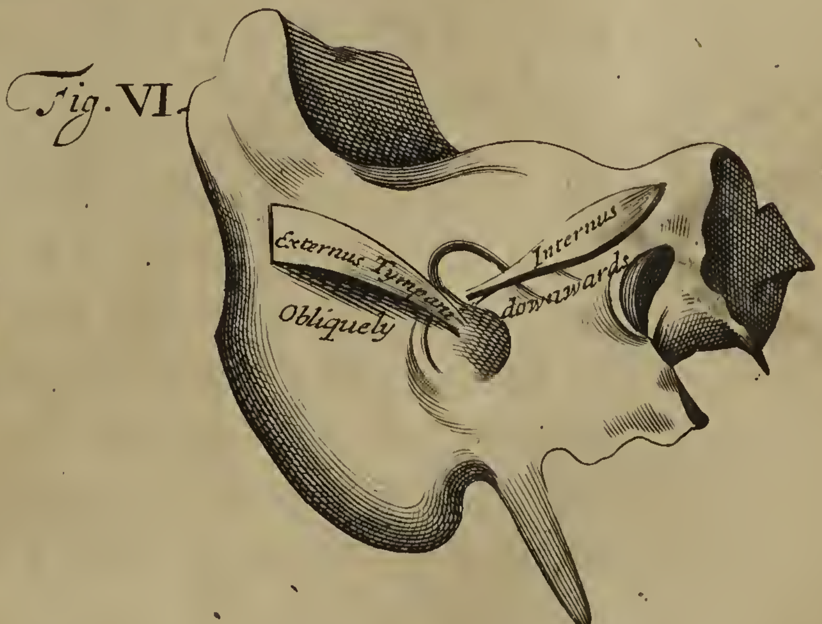


Fig. VI.



Obliquus Minor, or the *Eyes leſſer Oblique Muſcle.*

This brings the *Eye* obliquely downwards:

AS the former was the longeſt, ſo this appears as the ſhorteſt of the *Muſcles* of the *Eye*; it ariſeth from the lowermoſt Margent, or from a Chink in the lower part of the Orbite of the *Eye*, it being in its Origination, fleſhy, ſmall, and not altogether round, and being carryed obliquely all along upwards, towards the outward *Canthus* of the *Eye-lid*, is ſeen to terminate with a ſhort, but nervous *Tendon*, near the Verge of the *Iris*, or not far from the *Tendon* of the *Abducent Muſcle*, and in its Contraction, pulls the *Eye* obliquely downwards, towards the leſſer Angle.

Uſe.

Theſe two oblique *Muſcles* are of great Uſe in enlarging the ſight of the Eye, for by the various movings of theſe *Muſcles*, as carrying it upwards and downwards, inwards and outwards, the *Eye* becomes more expanded, and the Objects are made more plain and viſible to us.

Hiſtory.

P. Borellus, Obſ. 91. Cent. 3. tells us of a Fiſh, whoſe Guts being hung in a Glaſs Veſſel in the ſun, in the Dog days, they have been reſolved into Oyl; a few Drops of which being inſtill'd into the *Eye*, has recovered the ſight when near loſt: The ſame is reported of the *Lamprey* by *Gafferello*, who kept this as a very great *Secret*, and with which he cured a Noble woman, a Relation of a great Commander, who ſet a very great Value on it; and there are ſome, who do believe, that this was the ſame Fiſh, that *Tobias*, by the Command of the *Angel*, cured his Father with; for that was ſaid to be a Fiſh, long, like that of a *Serpent*, and voracious: Now a *Lamprey* is like in every reſpect to a *Serpent*, and is ſo voracious, that it has been ſaid of ſome which were kept in ſtanding Waters, that they have devoured Men.

Foreſtus tells us, that the *Liver* of this Fiſh being put into a Glaſs, and that ſet into another more wide, and placed in the ſun, it will yield a *Liquor* purely white and clear, much reſembling an Oyl, with which only anoynting the *Eye-lids* of thoſe that are blind, it will miraculouſly reſtore them to their ſight; and tells you further, in *Lib.* 11. *Obſ.* 35. he cured a Woman, who was near perfectly blind, and recovered her ſight only by thus uſing of it, and hath many times experimentally been approved of by others in the ſame Caſes, with the like ſucceſs.

This you have at Tab. XI. Fig. III. & V.

Elevator Oculi, or the *Eyes Elevater*.

This lifts up the *Eye*.

THIS *Muſcle* hath its Name from its Uſe, in raiſing the *Eye* upwards; it ariſeth from the upper Orbite of the *Eye*, ſharp and fleſhy, not far from that part, where the Optick Nerve appears, and becoming a fleſhy Belly, is inſerted into the horney Coat of the *Eye*, where it is clear, and near the *Iris*, by a thin and Membranous *Tendon*, and being contracted, does elevate, or raiſe the *Eye*.

By ſome this is called *Superbus*, allowed as the Maſter of Diſdain, and which it ſhews upon its turning upwards.

Hiſtories.

Luſitanus, Curat. 32. Cent. 7. acquaints us of a Boy, who received a large Wound in his Head, loſt the ſight of both his Eyes; and tho' he was perfectly recovered of his Wound, yet he never recovered his ſight.

Lycoſthenes tells us in the year 308, that there was born a Monſter in the time of *Conſtantine* the Great, with a double Mouth, with a double Row of *Teeth*, with a Beard, and four *Eyes*, and two ſhort *Ears*; and *Luſitanus*, Cur. 57. Cent 3. writes of a hairy Monſter, having four *Eyes*, two *Noſtrils*, and four *Ears*.

This you have at Tab. XI. Fig. III. & V.

Depreſſor Oculi, or the *Eyes Depreſſer*.

This brings the *Eye* downwards.

THIS being leſs than the former, hath much the ſame Origination, it ariſing from the lower part of the ſame Orbite, and carries in it the ſame Inſertion towards the oppoſite part of the Bulb of the *Eye*.

This is an *Antagoniſt* to the former, carrying no great Diſpoſition of *Vigour* in it, there being required leſs Force to depreſs, than to raiſe, and by ſome it is called *Humilis*, as being the Index of Humility.

This you have at Tab. IX. Fig. III. & V.

Adductor Oculi, or the *Bringer* of the *Eye* inward.

THIS hath its Name from its Uſe, it bringing the Pupil of the *Eye* towards the *Noſe*, it ariſeth from the Orbite of the *Eye*, near the beginning of the *Elevator*, drawing the *Eye* inwards towards the *Noſe*, and is inſerted to that part of the *Cornea* which is neareſt the *Noſe*; this by ſome is called *Bibitorius*, it directing the *Eye* towards the Glaſs, and bringing it towards the inward Angle. This draws the *Eye* inwards.

Annotat. That the *Eye* may perform its viſive Action aright, there ought to be kept up a perfect Sympathy amongſt its *Muſcles*, ſo that in their Operations, they may ſuſtain it in a due Poſition; now, when any *Muſcle* is ſeen to work more or leſs than its Companions, this does more than ordinary draw the reſt to it, by which it diſtorts and diſturbs the Sight, and upon this diſtortion, it uſually occaſions that which we commonly call *Strabiſmus*, or Squinting, which may ariſe from an ill habit of the *Muſcles*, eſpecially of this particular *Muſcle*.

Hiſtory. Dr. *Willis* in Lib. *de Aim. Brutor.* cap. 15. *de Vi.* writes of a Young Man troubled with the Palſy, who when his other *Muſcles* of his left Eye were Relaxt, this *Adductor* was ſtrongly Contracted, by which his *Eye* became ſo diſtorted, that every Object appeared double, nor could he diſtinguiſh any thing well with it.

This you have at Tab. IX. Fig. III. & V.

Abductor Oculi, or *Bringer* of the *Eye* outwards.

THIS by ſome is called *Indignatorius*, or the Scornful *Muſcle*, and *Abductor* from its Uſe, it bringing the *Eye* outwards from the *Noſe*; it ariſeth from the outward Angle of the *Eye*, and hath the ſame Inſertion with the former; when theſe four work together, they are allow'd to bring the *Eye* inwards, and do form a Tonick motion. This carries the *Eye* outwards.

Hiſtory. *Luſitanus*, Cent. 7. Curat. 63. writes of a Girl, who to all appearance was well in Health, yet out of the inner part of the Eye, which we call the greater Angle, the head of a Worm appeared, much troubling Her, and it being more cloſely lookt into by ſome inquiſitive People, they found it, and drew it out; 'twas the length of half a Hand, and of a whitiſh colour; during the time of its lodgement there, it gave her no great Pain, nor did ſhe receive much prejudice by it.

This you have at Tab. XI. Fig. III. & V.

Laxator Externus, or *Externus Tympani Auris*, or the *Outward Relaxer* of the *Drumb* of the *Ear*.

This brings the *Drum* forwards.

THE *Tympanum* or *Drumb*, is the Inſtrument of Hearing, or as *Conſtantinus* calls it, the Door of the Mind, it being formed and prepared for the reception and impreſſion of Sounds, or aſſuming to its ſelf, the firſt Senſible ſpecies thereof; its allowed a fine membrane, form'd out of many Nervous Fibrils; in the upper *Sinus* of the *Auditory* paſſage, is planted this *Muſcle*, which takes its Origination in a fine Expanſion, form'd of many Nervous Fibrillaes, which running gradually leſs and leſs, are ſeen carried to this Membrane, with a ſlender Tendon to the *Malleus*; and this membrane being drawn upwards and outwards, by its contraction, its made more tenſe in its upper part, to reſerve the Sound more entire, and ſend it to the *Ears* inward *Receſſes*.

Annotat.

This, tho' it be one of the ſmalleſt *Muſcles* in the whole Body, yet 'tis to be ſhewn entire, but not without difficulty; great care is to be uſed in opening of the *Os Petroſum*, about that thin Part near the *Temples*, whether it be done with a ſmall *Chiſſel*, or *fileing*, that ſo the pieces of the Bones being taken out by degrees, this *Muſcle* may not receive any prejudice: The like Care is to be obſerv'd in ſhewing the following *Muſcle*.

Hiſtory.

Fabr. Hildan. Obſ. 39. Cent. 1. writes, Of a Girl troubled with an Impoſtume in her left *Ear*, where at firſt ſhe had no *Feaver*, but after the 14*th*. day of her Diſeaſe, in which time the Abſceſs began to come to a Head, and the Matter ready to be Diſcharged, but it ſtill being kept in, by reaſon of the thickneſs of the Skin, it afterwards diſcharged its ſelf downwards: He being called, found the *Abſceſs* broke of its ſelf before he ſaw it, and yet ſhe became perplext with *Feaver*, Fainting, Vomiting, and abhorring her Diet; with Watchings, and

Pain of her Back and Kidneys, and ſhe not bringing any of the Matter upwards, ſhe ſoon after Dy'd:

This you have at Tab. VII. Fig. IV. *and at* Tab. XI. Fig. I, VI.

Laxator Internus, or *Internus Tympani Auris*, or the *Inward Relaxer* of the *Drum* of the *Ear*.

This brings it obliquely inwards.

THIS is planted in a bony Channel, and takes it Origination where the Petroſs Proceſs joyns it ſelf with the *Os Cuneiforme*, or Wedge-like Bone, and branching its ſelf into two ſmall and very thin *Tendons*, one of which is implanted into the upper part of the *Malleus*, and the other into its Neck, where being inſerted into it, is ſaid to draw it inwards and forwards, with the Membrane of the *Dura Mater* annext to it, whereupon the Membrane becomes ſtifned by the Contraction of theſe two Muſcles, as by two *Antagoniſts*, the one drawing it upwards and outwards, the other drawing it inwards and forwards, which ballancing each other, do ſo brace up the Membrane, as to make it tenſe, for the apter receiving the Appulſes of Sounds.

Hiſtory.

Joan. Franc. tells of a *Cobler*, who being much troubled with a continual Pain in his Head, and Noiſe in his Ears, by the advice of a Gentlewoman, mixed ſome *Nigella Seed* with warm Water, and dipping Cotton into it, and applying it to his Ear, it not only gave him Eaſe, but perfectly cured him thereof.

This you have at Tab. VII. Fig. I. *and at* Tab. XI. Fig. I. VI.

Longus Colli.

This Contracts the *Neck*.

THE *Neck* is allowed to be purpoſely framed as a Security for the *Wind-pipe*, in order to Reſpiration; and this *Muſcle* thereto belonging, ariſeth with a ſharp and fleſhy Beginning, from the Fore-part of the Body, and from the 5th. and 6th. upper Vertebres of the *Thorax*, and being enlarged in its middle, is ſeen to run upwards under the *Oeſophagus* or Gulet, and is joyned to all the ſides of the Vertebres, aſcending until he reacheth the firſt of them, where he meets with *Scalenus*, and then

then they both inſert themſelves with a ſharp nervous *Tendon*, into the *Tranſverſe Proceſs* of the firſt *Vertebre* of the *Neck.*

Uſe. By the Benefit of this *Muſcle*, and its Partner, the Neck is brought directly forwards; one only working, it is turned ſideways.

Hiſtory. Going once to *Windſor*, near *Colbroke*, I found one of the Guard lying upon the Ground as dead; he a little before was thrown from his Horſe, and pitching upon his Neck, diſlocated it, and was ſuppoſed to be dead; I coming to him, and finding a Pulſation, clapt his Head between my Knees, and with my Hands I readily reduced it, and reſtored him to Life; and inſtead of giving Thanks for the Mercy received, he fell a curſing, and wondred where he had been.

This you have at Tab. VIII. Fig. III.

Scalenus, or *Triangularis.*

This Contracts the *neck* IT's called *Scalenus*, from the Greek Word Σκαληνός, or a Figure with three ſides, this Muſcle being made much of ſuch a kind of Figure; it ariſeth fleſhy from the firſt and uppermoſt Rib of the *Thorax*, broad and fleſhy; and then narrowing its ſelf in its upper Courſe, it beſtows *Tranſverſe Fibres* upon all the *Tranſverſe Proceſſes* of the Neck, and is inſerted as the former, and does aſſiſt it in its Motions; this *Muſcle* hath a particular Cavity allowed it, thro' which the *Arteries* do deſcend to the *Arm*, and the Veins thence aſcending do paſs.

Hiſtory. I had ſome years ſince a Patient, who was an Old Lady living in *Norfolk*, that for many years had a Cancerous *Wen* in her Neck, much reſembling a Bullocks Kidney both in length and thickneſs, which ſhe for a long time bound up in a Linnen Cloath, and after that, with a black Piece of Silk ſo artificially, that it could ſcarce be diſcovered; at laſt it broke out into extreme large Fungus's, and what with the ill ſmell it carried with it, and the continual Eruptions of Blood attending, ſhe was ſo emaciated, that in a few days ſhe dy'd.

This you have at Tab. VIII. Fig. III.

Serratus Major Anticus, or the *Greater Saw-like Muſcle* planted forwards.

This brings the *Scapula* forwards and downwards.

NAture hath made the *Scapula* much like a Buckler, to guard the ſides and back part of the Trunk, it being fram'd much of a *Triangular* Figure, thin and broad, hollowed inwards, and convext outwards; nor has Nature here only given it, as a Security to the back part of the *Trunk*, but for the Inarticulation of the Shoulder alſo, and the Inſertion of diverſs *Muſcles* allowed it, by which it becomes faſten'd both to the Ribs, and to the *Occiput*, as alſo to ſome of the Spines of the Vertebres of the Neck.

This has its *Name* from its Figure and Make, as alſo from its Situation, it being planted in the ſide of the *Thorax*, with a ſingular, broad and fleſhy Subſtance, paſſing from the inner Baſis of the *Scapula*, to the 6th. or 7th. Ribs, according as *Riolan* deſcribes it, it ariſing from the two upper Ribs, even to the *Clavicle*, and the five inequal Extremities in the five True Ribs, and is implanted in two or three of the Baſtard Ribs before they become Cartilagenous. *Spigelius* and *Veſlingius* ſuppoſeth its Origination *è contra*, and ſome of its diſtinct *Teeth*, or Saw-like Indentions, being intermixt with the *Obliquus Deſcendens* of the lower Belly, do aſſiſt the ſaid Muſcle in its Motions.

Its Uſe

This is generally allow'd to dilate the *Trunk*, and to bring the *Scapula* forwards and downwards, when its Muſcles are relaxt, and may alſo be ſaid to faſten the *Scapula* to the Breſt.

Annotat.

Wounds hapning in the hinder part of the *Trunk* or Breſt, are reckoned dangerous, by Reaſon of the *Nerves* and *Tendons* there planted, as alſo by Reaſon of the Blood Veſſels there inſerted; and few or none here hapning are without danger, by Reaſon of the continual Motion of the Lungs, and of Blood falling upon the *Diaphragm* corrupting it.

Hiſtory.

Some years ſince, I was ſent for to the Right Honourable the Earl of *Bridgwaters* at *Eaſtridge*, to Cure one of his Gentlemen who was Wounded in the Breſt; a Neighbouring *Phyſician* being therewith concern'd, and not finding the Patient any better by his Application, ordered me to be ſent for to him; when I came, I took out a very long *Tent* which he had put into the Orifice, which gave the Patient a great deal of Pain and diſquiet, and inſtead of his *Tent*, I put in a hollow Pipe made of ſheet Lead, whereby a great deal of *Sanies* and *Pus* diſcharged its ſelf, after which the Patient began to be at eaſe, and by keeping his Body ſoluble with Gliſters, and dreſſing it with proper *Digeſtives*, and afterwards with *Mundificatives*, and after that with *Sarcotick* and *Epulotick* Medicines, the Gentleman recover'd, and lived many Years afterwards, tho' at my firſt coming, the wind came ſo ſtrongly from his Wound, that it almoſt blew out the Candle that was put near to it.

This you have at Tab. XII. *as alſo at* Tab. I. *in its proper Place, & alſo at* Tab. XVIII.

Serratus Minor Anticus, or the Leſſer *Saw like Muſcle Planted Forwards.*

This brings the *Scapula* upwards.

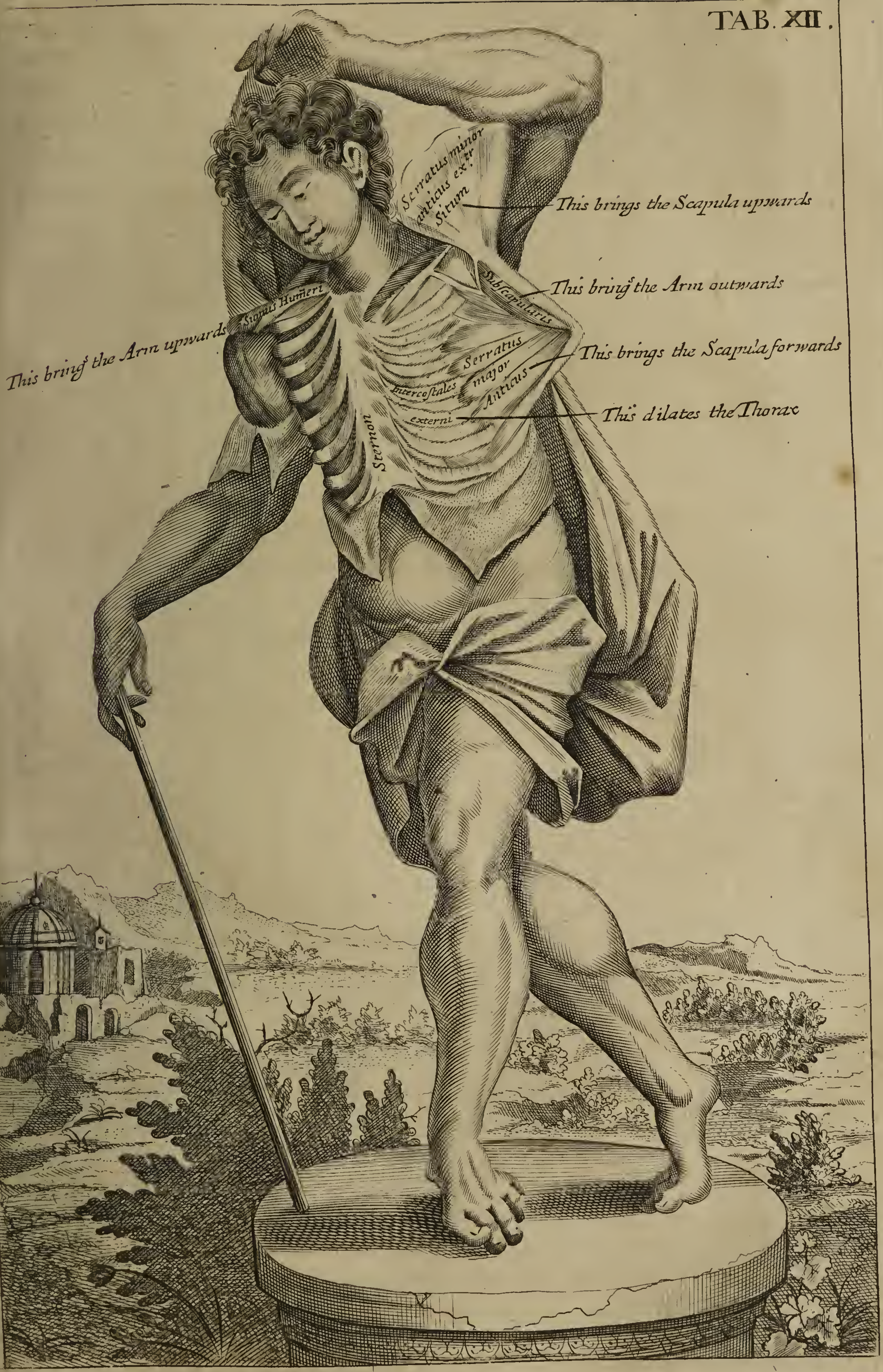
THIS hath its Name of *Minor*, given it from its difference with the former, and is ſo Subſtrated to the *Pectoral Muſcle*, that without you take great care in raiſing it, you will conſequently borrow from it; it ariſeth fleſhy from the upper Ribs, excepting the firſt of them, and ariſing as it were *Digitatim*, and being inſerted fleſhy at the *Corocoidal Proceſs* of the *Scapula*, bringing it forward to the *Thorax*: This and its Partner, are ſaid to promote the dilating of the *Trunk* in large *Inſpirations*: When the *Scapula* is properly raiſed by theſe *Muſcles*, which when depreſt, it cannot perform the ſame, without difficulty.

Obſervat. When ever any one is wounded in the *Trunk*, and no blood has entred its Cavity, you are to heal it with all ſpeed; if Blood, or Matter, be once lodged in the Cavity thereof, you are to keep it open, to diſcharge the ſame.

Annotations on the Muſcles of the Scapula.

The Muſcles of the *Scapula*, in their various Contractions, do produce different Motions, downwards, backwards, and principally upwards, to give Way to the motion of the Ribs in difficult Inſpiration: But I humbly conceive, that the prime Uſe of the Scapular Muſcles, is to faſten it to ſeveral neigh-

TAB. XII.


Serratus minor anticus extr: Situm
This brings the Scapula upwards
Subscapularis
This brings the Arm outwards
Signus Humeri
This brings the Arm upwards
Serratus major Anticus
This brings the Scapula forwards
Intercostales externi
This dilates the Thorax
Sternon

neighbouring parts, as to the *Head*, by the Interpoſition of the *Cucullaris*, eſpouſing the *Chine*, and by tying it to the *Occiput*, and to the back part of the *Neck*, by the loweſt *Vertebres*, and to the back, by the upper Spines belonging to the *Cucullaris*; and the *Baſe* of the *Scapula*, is fixed by the *Rhomboides* to the back, by the four upper *Spines* of the *Vertebres*; and the lower *Angle* of the *Scapula* is faſtned to the *Neck*, by its 2d. 3d. 4th. and 5th. *Tranſverſe Proceſſes*; and the whole *Scapular Baſe* is tyed laterally by the *Serratus Anticus Major*, and the *Proceſſus Coracoides* to the upper Ribs; whereupon the *Scapula* being firmly faſtned forwards and backwards to the *Trunk* by many Muſcles, it becomes a proper *Fulcimen* to the *Os Humeri*, to receive its variety of Motions, by reaſon *Omne mobile fundatur in immovabile*, upon the Account the Relative Terms of motion are celebrated; the *Terminus à quo* being active, and moveable, and the *Terminus ad quem* paſſive and immoveable, as to the Motion it receives; ſo that the Orbicular Head of the *Os Humeri* ſporting its ſelf in ſeveral Poſtures, upwards and downwards, backwards and forwards, which are entertained in the Socket of the *Scapula*, which being immoveable, ſtrangely ſupports the different Motions, performed by the Muſcles of the Arm; *Qui ſunt tot Hypomoclia*, as ſo many *Leavers* and admirable *Machines* of various oppoſite Motions, celebrated by *Antagoniſt Muſcles*.

Hiſtory.

Ferrandus Senior, Lib. *de Nephrit.* Pag. 8. writes, That in the Year 1567, upon opening of a dead body, he found in the left *Scapula*, a large *Tumor* in its Inner Parts, which being opened, there was found a very hard *Square Stone*, which was there bread from Coagulated *Blood*.

This you have at Tab. XII. *laid bare.*

Subclavius, or that Muſcle planted under the *Clavicle*.

This brings the *Clavicle* downwards.

THE *Clavicles* are ſo called, as *Diemerbroeck* writes, becauſe like a *Key* they Lock the *Scapula* to the *Sternon*, and by which they ſeem to ſhut up the *Trunk*; and whereas the *Sternon* is planted between the ends of the *Ribs*, in the Fore-part of the *Trunk*, to guard and ſecure the Bowels, as the Heart and Lungs, like a Buckler to which the cartilagenous part of the true Ribs are annexed; ſo the *Clavicles* are made crooked, and formed both of Convex and Concave Riſings, for the better Originations and Inſertions of *Muſcles*, &c. amongſt which this is one, which ariſeth fleſhy from the lower part of the *Clavicle*, and deſcending obliquely between the firſt *Rib* of the *Thorax*, and being enlarged forwards both with oblique and tranſverſe Fibres, is implanted at the upper part of the firſt Rib, near the *Sternon*; upon drawing or bringing of which upwards and outwards, it apparently dilates the *Thorax* or *Trunk*.

Obſervat. *Spigelius* writes, That its Uſe is to depreſs the *Clavicle* when it mounts upwards with the *Scapula*; and ſince it is plainly ſeen, that the *Clavicles* do naturally ariſe with the *Scapula*, *Provident Nature* has here planted this Muſcle, as a Brace, or a Stay, to keep them down, which is plain enough, as *Spigelius* obſerves; in that, when ever the *Clavicle* is fractured near the *Sternon*, the next part is viſibly ſeen to aſcend, and the part next the *Scapula*, together with the *Arm* apparently falls down; but if a *Fracture* happens near the *Scapula*, then neither parts are elevated, which wholly happens by the Interpoſition of this *Muſcle* here planted, and the Strength allowed it to perform this Office.

Hiſtory. Mr. *Wiſeman* tells you in Fol. 461 of his Book, of a *Page*, who falling down from behind the Coach, bruiſed his Face, and broke his Collar Bone; and being carryed to the next pretender to Chirurgery, who ſeeing his Face ſwelled, and his *Noſe* bloody, concluded it to be fractured, and filled up his *Noſtrils* with Tents, *&c.* and then finding his lower *Jaws* ſtanding unequally with the upper, ſuppoſed them diſlocated, and that part of the *Sternon* under the *Collar Bone* was broke down; he being ſent for to ſee the Youth, neither found Fracture nor Wound in the *Noſe*: The next day a Chirurgeon being called in to juſtifie this Pretenders *Proceedings*, but there nothing appearing either of Luxation or Fracture in the *Jaws*; they examined the *Sternon*, and found it well, but found an oblique Fracture of the Collar Bone; which being reduced, and bound up by them, with a Reſolution not to open it, till it ſhould be united; things being thus managed, the *Patient* was adviſed to keep his Bed, and to follow the Directions of his *Phyſician*, which he did; about the tenth day, our Chirurgeon, contrary to former Order, undreſt the fractured *Clavicle*, who upon binding of it too ſlack, ſaw the Bone ſtarted, ed, and from that time, it grew painful; then he dreſt it four or five days afterwards, but the *Pain* encreaſing, Mr. *Wiſeman* was ſent for again, who then ſaw one end of the *Clavicle* riding over the other, and pricking againſt the Skin; the *Callus* being confirmed, the ſtraiter the Chirurgeon made the Bandage, the greater was the *Patients* pain; he not imagining the Cauſe, attributed it to the Fault of the *Patient*: Upon which, Mr. *W.* being again ſent for, and finding the *Pain* did ariſe from the end of the fractured Bone pricking in the Skin, he cauſed half a *Walnut Shell* to be plaiſtred over it; and having thereby defended it from preſſure, he made uſe of his Arm, and complained of no more pain, &c.

This you have at Tab. XII.

Intercoſtales Externi, or the outward *Intercoſtals.*

These do dilate the *Thorax.*

THeſe *Intercoſtal Muſcles*, with the *Ribs*, *Sternon*, and *Diaphragm*, are all engaged in various Motions, and each contributing towards the main Motion of the *Lungs*: Theſe *Intercoſtals* let in between the Ribs in oblique *Poſitions*, are formed into two Ranks, outwardly and inwardly, made out of numerous equidiſtant Fibres ſtrongly interſecting each other. Theſe take their Names from their Situations, and do ariſe from the tranſverſe Proceſs of the back, where the Ribs are joyned, and proceeding fleſhy, do adjoyn themſelves from the lower Edge of the upper Rib externally, to the upper part of the lower Rib, being both thin and fleſhy.

This double *Series* of Fibres, interſecting theſe *Muſcles*, were thus wiſely framed by *Nature* for the aſſiſting of each other in convenient Motions, in that, two Ranks of Oblique Fibres would with Eaſe diſtort the Ribs in the moving of the Breſt: Nature hath therefore prudently contrived, that all their Fibres decuſſating each other, and being affixt to the Margent of the Ribs, ſhould joyntly produce the ſame operation of moving them upwards and outwards at the ſame time.

Columbus writes, that in a Woman diſſected by him, he found more Ribs in her, than in a Man, whence ſome of his Brother Phyſicians declared, this was the Woman that had got that Rib from *Eve*, which ſhe had ſtolen from *Adam*: *Jacobus Carpus* writes *Iſagog. Anat.* that in a publick Anatomy, he ſaw one of the true Ribs double, where it was joyned to the *Breaſt Bone.*

Valleriola Lib. 5. Obſ. 8. writes of one wounded by a *Piſtol Shot*, which paſt tranſverſly thro' the *Trunk*, making its way thro' the *Intercoſtal Muſcles* of either ſide, and yet was cured.

This you have at Tab. III. *and at* Tab. XIII.

Intercoſtales Interni, or the *Inward Intercoſtals*.

These con-ſtringe the *Trunk*.

THESE are ſeen to begin, where the *Ribs* begin to turn inwards, and then running from the lower to the upper parts of the *Ribs*, not only to the *Cartilage*, but under that to the *Sternon*, they working contrary to the former; for theſe in *Expiration*, do bring the *Trunk* inwards and downwards, and by contracting its ſelf, is hereby ſeen to leſſen its Cavity.

Annotat.

Wounds of the Breaſt, if they penetrate the inward Parts, are generally allow'd Mortal; if not, they are not to be Cured without Care; and theſe many times have produc'd theſe following Accidents, as *Pain*, *Cough*, *Feaver*, *Faintings*, &c. which *Accidents* here hapning, muſt either ariſe from the largeneſs of the Wound, or from the Fault of the *Patient*, or the Chirurgeon; and therefore it will not be amiſs, to give the Reader ſome proper Symptoms of Wounds penetrating, and not penetrating the Cavity of the *Trunk*: If a Wound therefore enters the Concave part of the *Trunk*, Wind is ſeen to come out thence, and a Noiſe is heard within; nay, very oft ſo forceably has the Wind come forth out of the Wound, that it has blown a lighted Candle out,and this more uſually upon the *Patients* coughing; if the *Lungs* be wounded, the *Blood* that comes out by the Wound, is ſeen froathy and clear; if the Heart be wounded, all the inward parts grow cold and chill; and when it appears ſo, there's little hopes left of cure; yet tho' many times theſe Wounds have proved fatal, yet at other times they have been moſt certainly cured; and *Fallopius* has layd it down for a general Maxime in his Book, *de Vulnerib. cap.* 12. wounds of the *Thorax* do never bring death with them, where the inward Bowels are ſafe, and untoucht; but many times, where they have been inartificially treated, they have turned into *Fiſtulaes*; many of which he hath cured.

This you have at Tab. IX. Fig. III. *and at* Tab. XVIII.

Triangularis, or *Pectoralis Internus.*

THIS is commonly called *Triangularis,* becauſe it carries in it ſomewhat of a *Triangular Figure,* altho' not much of it, and *Pectoralis,* it ariſing from the lower part of the *Sternon,* or *Os Pectoris,* from whence its upper part borrows its Origination, and its lower falling down to its Inſertions at the bony Endings of the 4th. 5th. 6th. and 7th. and ſometimes at the 8th. Ribs near their Cartilages; by the Adduction of which, they are ſaid to conſtringe the *Thorax,* and bring it ſomewhat forwards.

This Conſtringeth the *Thorax.*

This is not to be ſhewn by Figure, *as I ſaid in my Firſt.*

Of the Uſe of the Thoracical *Muſcles.*

The *Antagoniſt* Muſcles of the *Thorax* or *Trunk,* being continually buſied in oppoſite Actions, of dilating and leſsning the Cavern of the Breſt, do not admit of any *Tonick* Motion; but are reſtleſs in their alternate Contractions of Elevation, and Depreſſion of the Ribs, which are ſo oppoſitely articulated with the Chine by mutual Inſinuations, that eaſily participate variety of Motions, as upwards and outwards in Inſpirations, as alſo downward and inward in Exſpiration; the laſt being performed by fewer Muſcles, becauſe the Ribs were ſomewhat ſtreightned in the Expanſion of the *Thorax,* do by their innate Diſpoſition of recoyling, contribute very much to reduce themſelves from their Tendency toward a Plain to their former Arches.

The Muſcles of *Inſpiration* claim the firſt Place of Treatment, as they precede thoſe of *Expiration* in Order of Nature and Action, and are chiefly ſeated in the *Anterior,* or lateral Region of the *Thorax,* viz. *Scalenus Primus, Secundus & Tertius,* ariſing from the *Tranſverſe* Proceſſes of the *Vertebres* of the *Neck,* and the *Subclavius,* ariſing out of the *Clavicle,* and *Spine* of the *Scapula*; this and the firſt and laſt *Scalenus,* inſerting themſelves into the firſt Rib, and the ſecond into the ſecond, and ſometimes into the third Rib, and all theſe Muſcles are Coadjutors in the Elevation of the three upper Ribs, and the *Serratus Anticus*

ticus Minor, derived from the *Proceſſus Coracoides Scapulæ*, is inſerted by its fleſhy Fibres into the bony part of the 2d. 3d. 4th. and 5th. Ribs, and the *Serratus Major Anticus* ariſing out of the whole Baſis of the *Scapula*, is laterally inſerted with ſo many fleſhy Indentments into the right upper Ribs, ſo that the *Serratus Minor Anticus*, and *Major*, are as auxillaries in the lifting up the eight upper Ribs, and expanding the Capacity of the Breſt in Inſpiration.

The *Intercoſtal Muſcles* lodged in the Interſtices of the Ribs, do accompany their *Arches* both above and below from the Chine to their *Terminations*, affixed to the Cartilages of the *Sternon*: Theſe *Twins* of Muſcles are denominated *Externals* and *Internals*, each of which borrowing their Origine from the Margin of every ſuperiour Rib, and are inſerted into the upper edge of the lower. Theſe ſemicircular Muſcles do affix their tendinous and fleſhy Fibres, (interſecting each other in obtuſe Angles) as auxillaries to every point of the Circumference, belonging to each Rib, and do make nearer Approaches to each other, by alternate Motions, immediately ſucceeding in a Moment, as if all the Muſcles made but one entire motion; ſo theſe Conjugations of Ribs are drawn joyntly upwards and outwards, by eleven Machines of motion, as by a *Teem* of many Horſes, aſſiſting each other: Theſe arched *Muſcles*, are ſo many *Hypomoclia*, or *Leavers* of the Ribs, joyned in one Extremity to the *Chine*, as a Fulciment of their motion; and as they recede further and further from it, to the other Extremity, faſtned by Cartilages to the *Sternon*, as to the oppoſite *Fulciment*, ſupporting the joynt Motion of the *Intercoſtals*; ſo that theſe, and the other precedent *Muſcles* do dilate the *Thorax*, externally in breadth, and the *Midriff* in length, which in its lower Region borroweth its Origine partly fleſhy, and partly tendinous on the right ſide of the *Chine*, from the 1ſt. 2d. & 3d. Vertebres of the Loyns, and on the left ſide, from the two lower Vertebres of the back: And the *Midriff* in its upper Region ariſeth thin and tendinous, but then ſoon grows fleſhy at the lower Margin of the cartilagenous Terminations of the Ribs, and the lower Terminations, or Extremity of the *Sternon*, whence the fleſhy Fibres (like lines drawn from the Circumference to the Centre,) paſs into the middle Region, where the tendinous Filaments interſecting each other, become reticular.

This *Circular* Muſcle, faſtned to the *Vertebres* of the *Back*, and *Loyns*, as to a poſterior Part, and to the *Sternon*, as to an anterior *Fulciment* of Motion, whoſe various *Scene* is acted by carnous Fibres, as ſo many *Actors*, beginning their Motion from the Cicumference, to the Tendinous middle of the *Diaphragm*, as to a Center, and the Circumferences to the Margine of the lower *Ribs*, and backwards to the *Back* and *Loyns*, as ſo many *Uſeful Props* of *Motion*, which is accompliſh'd by various Fibres, Contracting themſelves downwards, and by bringing the Arch of the *Midriff* to a Plain, do enlarge the *Perimeter* of the *Thorax* to receive the tender compage of the *Lungs* into its ſoft Embrace and Umbrage; the *Antagoniſt Muſcles* to theſe of *Inſpiration*, are thoſe which do narrow the *Thorax*, in reference to *Exſpiration*, and of theſe, the firſt is, *Serratus poſticus inferior*, deriving its Origin from the *Vertebres* of the *Back* and *Loyns*, and is Inſerted with four fleſhy Indentments about the middle of the three Lower, and the termination of the laſt *Rib*: This *Indented Muſcle* Contracting its ſelf from the middle of the *Ribs*, to the *Vertebral Spines* of the *Back* and *Loyns*, and the *Sacrolumbalis* ariſing out of the *Os Ileon* and *Sacrum*, and *Tranſverſe Proceſſes* of the *Vertebres* of the *Loyns*, are inſerted with thin Tendons into every *Rib*, and in Contracting its various Fibres towards the *Chine*, *Os Sacrum*, and *Os Ileon*, pulls down the *Ribs* to theſe props of Motion, Supporting it in the *Serratus poſticus Inferior*; the *Sacrolumbalis*, and *Triangularis*, conſiſting of many *Muſcles* lodged in the Inſide of the *Sternon*, near the Cartilages of the 4th. 5th. 6th. 7th. and 8th. *Ribs*, which they pull downwards, and inwards, by many Fibres to the Inſide of the *Sternon*, the *Fulciment* of Motion; by which the capacity of the *Thorax* is narrowed in *Exſpiration*.

The Delineation of the *Thoracic Muſcles*, and their actions being premiſed, *Reſpiration* may hence be celebrated, as it conſiſts of Inſpiration and Exſpiration, to exalt the Blood with *Nitroſulphureous*, and *Elaſtick* Particles of *Air*, and of Exſpiration, to diſcharge its effate *Atomes*, and the *Fuligenous Reak* of the Blood. Inſpiration is thus accompliſhed, the *Air* being preſt down by the weight of the ſuperincumbent *Atmoſphere*, is puſhed into the pipes of the Noſtrils, and from thence is protruded as Particles of *Air* crouding one another through the *Rimula* of the *Larynx*, dilated by the *Poſtici*, and *Laterales Muſculi Cricoarytænoides* into the *Bronchia*, and numerous appendent

Veſicles which are highly expanded by the *Elaſtick Particles* of *Air*, endeavouring to break Priſon, and acquit their Confinement of the Orbicular *Pipes*, whereupon the Boſom of the *Thorax* is enlarged, by the Muſcles encircling it. The *Subclavii*, *Scaleni*, and *Serrati Antici*, ſeated in the anterior Region of the *Thorax*, and the *Intercoſtals* in each lateral part thereof, and the *Serrati Poſtici Superiores* in the poſterior Region, which joyntly conſpire as ſo many *Hypomoclea* lifting the Ribs upwards and outwards, to give Reception to the tumefyed *Tubes* of the *Lungs*, and on the other ſide, the *Antagoniſt Muſcles*, the *Triangular Muſcles* lodged in the inſide of the *Sternon*, and the *Serrati Poſtici inferioris Sacrolumbaris* behind, take their turns, as *Actors* in the various Scenes of Motion, by pulling the Ribs inwards and downwards, and tho' among the *Machines* of Motion, the *Depreſſors* are leſſer in Number, than the *Elevators*, yet the former have this advantage moving downwards, as preſſed by their Weight to reduce themſelves by their innate Inclination to their proper Stations; ſo that theſe *Antagoniſt Muſcles* do on one Hand elevate the Ribs, and do preſs the entrails of the loweſt *Apartment*, by the motion of the *Diaphragm*, from an *Arch* to a *Plain*, to make way for the *Entertainment* of the *Lungs* inflated with air, inſpiring the Blood with volatile ſpirituous, and *Elaſtick Particles*, whilſt the *Depreſſors* on the other ſide, by the recoyling of the Ribs, and the Weight of the Lungs, compreſſing the *Bronchia*, and appendent Veſicles, do expel the vapid *Particles* of air, loaden with ſmoaky Steams of Blood.

Diaphragma, or the *Midriff.*

This divides the middle from the lower *Belly*.

THIS by ſome is called *Septum Tranſverſum*, it tranſverſly dividing the *Trunk* of our Body into two Venters, it being made as Natures partition Wall, keeping the middle from the lower Belly, partly tendinous, and partly fleſhy on the right, from two or three of the Vertebres of the Loyns, and round the termination of the *Ribs*, and *Enſiformal Cartilage*, and carrying its *Tendon* in its *Centre*: It was chiefly deſigned for the promoting of our free Breathing, it being aſſiſted by ſome of the *Intercoſtal* Muſcles, it carrying in it a *Circular Figure*, and perfectly different in its Site, from the reſt of the Muſcles in Humane Body, its Capacity anſwering the tranſverſe Bottom of the *Trunk*, its middle Subſtance being framed of carnous Fibres running thro' it, like ſo many Lines from a Circumference to a Centre; and when they enter the middle, they are entertained and embraced with another ſort of tendinous Fibres interſecting them: Its Membrane is double, the upper part whereof expands the *Pleura*, here being planted as its *Mediaſtinum*, or partition Wall, whilſt its lower part is carryed downwards towards the *Peritonæum*: It is drawn out into many Fleſhes about the *Lumbal Vertebres*, and is ſtrongly tyed to the Ribs by two tendinous parts, which deſcend in their March even to the *Os Sacrum*, thro' which the deſcending Trunk of the greater Artery, and the *Vena Azygos* does paſs in its aſcent, it is ſhortned about its middle towards its right ſide, and in its tendinous part to make a Paſſage for the *Vena Cava*, and in the left, in its fleſhy part, it receives the *Oeſophagus*, and the *Stomatick Nerves*.

Uſe. In Inſpiration it turns into a plain, and from a crooked or convex Laxity, it apparantly comes into a plain again; but in Expiration, it is made tenſe, but is ſoon relaxed.

Obſervat. When this Orbicular Muſcle moves its ſelf, it contracts the upper and lower fibrous Diameters or Semicircles, ſo that the cartilagenous *Terminations* of the *Baſtard Ribs* are drawn downwards, and its *Viſcera* forced downwards with them at the ſame time; whereby the Breſt becomes lengthned, and its Boſom enlarged to give a Reception to the diſtended Lungs in *Inſpiration*: Whereas in *Expiration* it hath a *Diaſtole*, as freed from Motion by the Relaxation of its fleſhy Fibres, (planted in its circumferential part) performed by the *Abdominal Muſcles* as its *Antagoniſts*, which by preſſing the fore-part and ſides of the *Abdomen* inwards, do at the ſame time force the *Viſcera* of the lower Belly upwards towards the *Trunk*, whereupon the *Centre* of the *Diaphragm* looſeth its plain, as Dr. *Collins* very well obſerves.

Hiſtory. *Hollerius Com. ad Aph.* 18. lib. 6. writes, that the *Diaphragm* being wounded in its membranous part, is not to be cured, but in the fleſhy part it may; and yet *Benedictus* remembers a *Souldier*, who was cured of ſuch a Wound; and *Hollerius* writes in another place, that he had obſerved in a Fellow that was hanged, and afterwards diſſected at *Paris*, that he ſaw a *Wound* covered with a Cicatrice in the fleſhy part of the *Diaphragm*: *Jacotius Com. ad Aph.* 15. Lib. 1. Sect. 3. *Coac. Hip.* writes, that he cured a Young man wounded in the Back, about the middle of the *Vertebres* of the *Thorax*, not far from the *Spine*, and the whole *Trunk* perforated, and the Weapon paſſing through his right *Hypochondry*; yet, tho' the *Flux* of Blood was large, and much Wind and Spirit came thro' the Wound with noiſe, and the *Septum* every way ſtabb'd, with ſome Signs of the *Livers* being wounded, he recovered of his Wounds.

This you have at Tab. XVIII.

Cor cum Arteriis & Venis, or the *Heart* with its *Arteries* and *Veins*.

The *Heart* is a Muſcle of great Uſe, in ſerving the Body with Blood.

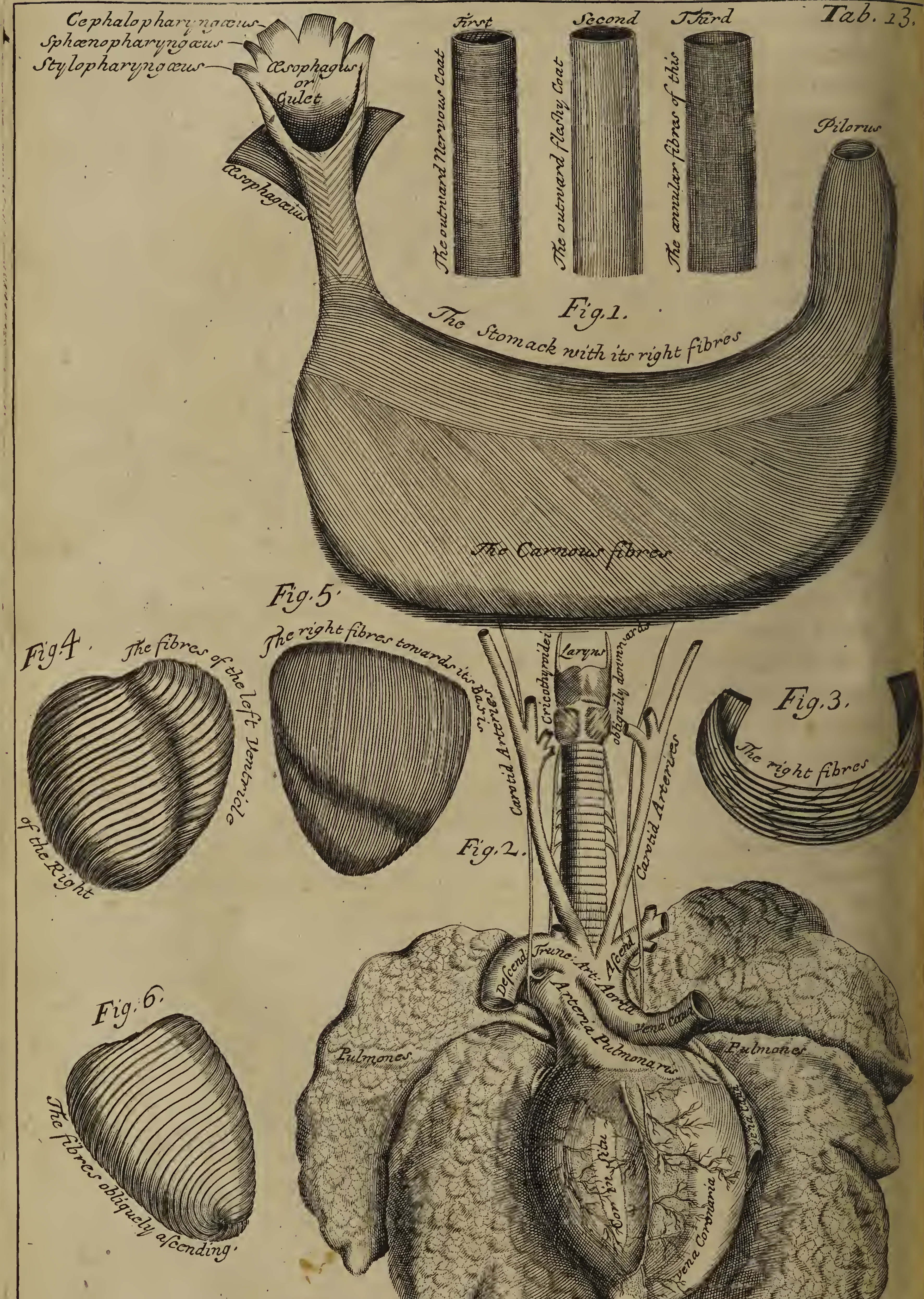
THE *Heart* being the moſt Noble, as well as uſeful Machine of Motion, found in the *Theatre* of Humane Body, altho' its a *Muſcle*, may well enough be allowed the *Sun* of our *Microcoſm*, from whence all the bright Rays of our Life and Warmth do take their Origins. Hence was it, that the *Alwiſe Architect* placed this vital Repoſitory in the middle of the *Trunk*, for its more ready and equal Diſtribution of its vital Nectar to all the parts of our Body.

It's apparently ſeen tyed to the *Vena Cava*, and great *Artery*, and its Baſis adjoyns its ſelf to the back part of the *Trunk*, and is affixt to the *Pericardium* and *Diaphragma*; it has allowed it two *Ventricles*, viz. a right and a left, both diſtinguiſht by a carnous middle, outwardly gibbous, inwardly concave: Some *Anatomiſts* do call theſe, *Muſcles*, they ſuppoſing the *Fibrilla's* thence ariſing, and extended even to the tricuſpid *Valves* to be their *Tendons*, there planted on purpoſe for promoting the Contraction of the *Valves* of the *Heart*, which altho' they are framed with many ſmall fleſhy Fibres curiouſly ſet together with wonderful Art, yet they are no where ſeen perviated, which hath occaſioned no ſmall Miſtake among the *Antients*, who ſuppoſed, that by theſe its large Pores, the Blood had a paſſage out of the right, into the left *Ventricle* of the *Heart*.

The Motion of the *Heart* is plainly diſcovered throughout the whole Body, in that, as it firſt makes the Blood, ſo alſo doth it propel the ſame by the Pulſation of its *Arteries*, into all the parts of the Body for their Nutriment.

And for the better performance whereof, *Nature* hath allowed it various kinds of fleſhy Fibres, ſome of which are Spiral ſent into it, and others ſeen to march in oblique Angles,

Tab. 13.


Cephalopharyngæus
Sphænopharyngæus
Stylopharyngæus
Œsophagus or Gulet
Œsophagæus
First
Second
Third
The outward Nervous Coat
The outward fleshy Coat
The annular fibres of this
Pilorus
Fig.1.
The Stomack with its right fibres
The Carnous fibres
Fig.5.
The right fibres towards its Basis
Fig4.
The fibres of the left Ventricle
of the Right
Larynx
Cricoarytænoidei
obliquely downwards
Carotid Arteries
Carotid Arteries
Fig.3.
The right fibres
Fig.2.
Descend.
Trunc: Art: Aorta
Ascend
Arteria Pulmonaris
Vena Cava
Pulmones
Pulmones
Cor in situ
Vena Coronaria
Fig.6.
The fibres obliquely ascending.

gles, before they arrive at the *Tendons*, for the more ready promoting of their Contractions, making them ſtrong and turgid, and in a well boyled *Sheeps* or *Calves* Heart freed from its Auricles and Veſſels, we may with eaſe diſcover a ſtrong *Tendon*, encircling the Margent, about the Entrance into the right and left *Ventricles*; into which *Tendon*, as Dr. *Lower* well obſerved, are planted many oblique fleſhy Fibres.

Nor are its outward parts alone, but its inward Cavities alſo, ſeen furniſhed with carnous Fibres, carryed along in Flexures, they marching upwards thro' the outward ſurface of the *Ventricles*, and ſo inſerted into its *Baſis*.

And its plainly evident to every clear Eye, that the Fibres encircling both the outward and inward Surface of the left *Ventricle* of the *Heart*, tho' they may ſeem to march Antagoniſtically to the others in their Progreſs, yet they are ſeen plainly to aſſiſt them in their Motions, and do conſtringe and bring the oppoſite *Tendons* inwards; and by drawing them cloſer to each other, they at the ſame time do leſſen their Cavities, and ſqueeze forth the Blood out of the right *Ventricle* into the *Pulmonary Artery*: And when we come to conſider the Heart in a more ſtrickt Senſe, we may truly allow, that it is made of fleſhy Fibres, all which do bear a Communication, with a Membrane formed out of tendinous Fibres; which Membrane being planted at the Baſis of the Heart, does keep the *Auricles* fixt to it, which may ſerve as one Reaſon for allowing this to be a Muſcle. Again, both the *Auricles* are ſeen to contract and dilate themſelves at the ſame time, as alſo do both the *Ventricles* in the ſame manner, ſave only with this Difference, that when the *Auricles* do contract themſelves, the *Ventricles* become dilated; and when the *Ventricles* do contract themſelves, the *Auricles* in the ſame manner are dilated; and this further makes for the *Hearts* being a Muſcle, whoſe *Auricles* may well enough be ſuppoſed its *Antagoniſts Muſcles*. In the *Heart* alſo we obſerve ſeveral Orders and Degrees of Fibres, as I have ſhewn in my 13 *Tab. Fig.* 3, 4, 5 & 6. the firſt of which are ſeen to march along in ſtrait Lines, from the Baſis of the Heart to its Extremity, and paſſing ſomewhat over the right *Ventricle*; another ſort are thoſe which goe from the Baſis, and having arrived at the middle of the Heart, make their return back again to the Baſis from whence they came: A third are thoſe, which marching from the Baſis, do in a ſpiral manner reach to the end thereof; all and every of theſe ſorts of Fibres have allowed them their proper Uſes and Offices, for we apparently find, that the ſtreight Fibres do ſhorten the *Heart*, the *Circular* ones do ſtreighten it, and the ſpiral Fibres do wreath it, or twiſt it ſide-ways; from all which, we may reaſonably conclude the *Heart* to be a Muſcle, whoſe Action chiefly conſiſts in ſtreightning the Cavities, which are planted among its Fibres; and if ſtill we would conſider it more nicely, we may allow the *Heart* to be a Muſcle having three Venters, each *Auricle* making one, and the body of the *Heart* a third, whilſt we reckon the Membrane which terminate its Baſis, and where both their Fibres concentre, to be the common Tendon.

And ſince, in the Appendix I have ſhewn from the late Dr. *Lower* the Circulation of the Blood, and by what Paſſages and Pipes it paſſeth thro' the *Heart*: We may next conſider how the Blood Circulates in the *Fœtus*, where we may Obſerve, that in the Right *Ear*, juſt oppoſite to the mouth of the Deſcendent *Cava*, there is a Cavity ſeen commonly call'd the *Foramen Ovale*, which makes its paſſage into the *Vena Pulmonaria*; which Cavity having a Valve allowed it for ſuffering the Blood to enter the Vein, but hinders its coming back again. Now, the blood which comes from the *Placenta*, by the *Umbelical* Vein into the *Porta*, is ſent into the *Cava* by a channel, which goes from the Trunk of the *Porta*, to the Trunk of the *Cava* in the *Liver*; and this aſcending the *Vena Cava*, is directly thrown thro' the *Foramen Ovale*, into the *Vena Pulmonaria*; whence it is carried into the left Ventricle, and thence is thrown into the *Aorta*, to be diſtributed thro' the whole Body: But the blood which comes to the *Vena Cava Aſcendens*, is carried off by a branch of the *Cava*, from the *Foramen Ovale*, and brought into the *Right Ventricle*, and after that into the *Arteria Pulmonaria*, from whence immediately it is diſpatcht by the *Ductus Botalli*, into the *Aorta* or great Artery, to be mixt with the reſt of the Blood; ſo that we plainly ſee, that the blood which comes from the *Vena Cava Deſcendens*, does only paſs thro' the *Left Ventricle*; and that the blood which comes from the *Cava Aſcendens*, does only paſs thro' the *Right Ventricle*.

To this I ſhall add an Experiment about the *Foramen Ovale*, which I receiv'd from Dr: *Connor*, where he tells us, as I formerly ſaid, that the Blood does Circulate thro' the *Heart* in a different manner in the *Fœtus*, from thoſe that are born; for in us, as he

“ well obſerves, it paſſeth all along the *Right Ventricle* to the
“ *Lungs*; from the *Lungs* into the *Left Ventricle* of the *Heart*, and
“ from thence to the *Aorta*, which carries it all over the Body;
“ but in the *Fœtus*, it does not paſs through the *Lungs*, becauſe
“ there is no Reſpiration in the Womb, but part of it is ſeen to
“ paſs from the right *Ventricle*, into the *Canalis Arterioſus*, into the
“ deſcending *Aorta*, whilſt another part thereof paſſeth from the
“ *Vena Cava*, thro' a particular Door, called *Foramen Ovale*, into
“ the left *Ventricle*, and from thence into the great *Artery*: But
“ after a Child is born, then beginning to breath, all the
“ Blood goes to the right *Ventricle* of the *Heart*, and from thence
“ to the *Lungs*; and in a little time, both the *Foramen Ovale*,
“ and *Canalis Arterioſus* cloſeth up, tho' ſometimes the *Blood* hath
“ been ſeen to circulate thro' them; as he himſelf found in
“ diſſecting a *Girl* about four years of Age, in which was found
“ no *Hymen*, but the *Foramen Ovale* was then open, and inſtead
“ of being *Oval*, it rather appeared *Semilunar*; and he doubts
“ not but it may be found open in ſome perſons of riper Age,
“ as he has proved in his *Diſſertationes Medico-phyſicæ*; where he
“ gives an Account of a Humane Skelleton he ſaw at *Paris*,
“ in which the *Vertebræ* of the *Back*, the *Ribs*, the *Os Sacrum*, and
“ the *Os Ileon*, were all one continued Bone, without any Joynts
“ or Ligaments.

And as it is well known, that the *Heart* has its Arteries from the *Aorta*, and ſendeth Veins to the *Cava*, and that it takes its Nerves from the *Plexus Cardiacus*, and *Par Vagum*; ſo is the whole cloſed up in a membranous Bag, called the *Pericardium*; and having ſhewn elſewhere, by what Ways and Methods the Blood is ſeen to circulate through the Heart, we may hence conclude, that when the *Auricles* are full of Blood, the *Ventricles* of the Heart are empty; and becauſe the *Auricles*, ſo ſoon as they are filled with Blood, do contract themſelves, this Blood which they do preſs or puſh into the *Ventricles* of the Heart, being aſſiſted by the Spring of their *Fibres*, dilates them, and forces the *Animal Spirits* out of them into the *Auricles*, to compleat their Contraction; but ſo ſoon as the *Auricles* are contracted, the Blood which advanceth on all ſides, joyn'd with the Force of the Spring of their Fibres, reſtores them to their former *State*, and the *Spirits* paſſing in that Moment from the *Auricles* to the Heart, ſhuts it up, and cauſeth its Contraction; and hence is it, that the *Auricles* empty themſelves, when the *Ventricles* of the Heart are filled, and that the *Auricles* fill themſelves, when the *Ventricles* of the Heart are emptyed; and having thus explained the filling and the emptying of the *Auricles* and the *Ventricles*, we may properly next conſider the quickneſs of this their Motion; and whereas its generally allowed, that each *Ventricle* will at leaſt contain an Ounce of Blood in it, which may make us freely ſuppoſe, that the *Heart* throws into the *Aorta* an Ounce of Blood at every of its Contractions; and whereas the *Heart* is ſaid to contract four thouſand times in an Hour, either more or leſs, according to the different Temperament, *Sex* and Ages of the perſons herewith concerned; hence it follows, that there do paſs through the *Heart* every Hour 4000 Ounces, or 350 Pound of *Blood*. Now the whole Maſs of *Blood*, by common Computation, being not above twenty five pound, we ſee ſuch a quantity of Blood, as equals the whole Maſs, doth paſs thro' the Heart fourteen times in an Hour, and is ſeen to keep its Turn about every fourth Minute; but this is not to be allowed ſo from all parts, it not being reaſonable to ſuppoſe, that the Blood which paſſeth into the Extremities, can make ſo ſpeedy a Return, as that which goes only to the Kidneys or Liver; moreover, the quickneſs and quantity of Blood, together with the time of its circuling in different *Blood Veſſels*, do very much alter its Stages, according to their Lengths and Orifices of Veſſels, and according to the greater or leſſer Compreſſion of them, as being taken alſo into different parts, thro' which they paſs; as alſo according to their more or leſs Windings and Turnings, and to their fewer or more Branches, into which they are divided: Having thus briefly diſcourſed in general of the *Heart*, conſidering it as a Muſcle, and of the Circulation of the Blood, and the Quickneſs of its Motion, before I treat in particular of the Arteries and Veins, I ſhall here inſert one of Dr. *Connor's* Experiments, about the Motion of the Heart, which is as follows.

" Conſidering the Bulk of the *Heart*, with the Quantity " and Continuation of its Motion, and comparing them with " the Bulk and Motion of one *Eye*, I could never conceive, " that the Motion of the *Heart* proceeds from the ſame Cauſe

“ as that of the *Eye*; for the *Heart* has at leaſt ten times the Bulk,
“ and in twenty four hours a million of times the quantity
“ of Motion, and yet the *Eye* hath twenty times more *Nerves*
“ than the *Heart*; nay, I could never trace any one Fibre of a
“ Nerve, beyond the *Pericardium*, or at fartheſt, the outward
“ ſide of the Baſis of the *Heart*, tho' our *Authors* all agree, that
“ theſe *Nerves* do enter the Muſcular Subſtance of the *Heart*, and
“ produce its conſtant Motion; for my part, I neither could my ſelf
“ diſcover (nor yet get any Body elſe to ſhew me) thoſe *Nerves*
“ in the *Heart*, tho' I have endeavoured to find them out in
“ a *Horſe*, in an *Aſs*, in a *Calf*, in *Dogs*, and in the Humane
“ Body alſo: From whence I muſt neceſſarily conclude, that
“ this conſtant, and involuntary Motion of the *Heart*, can never
“ proceed from the few Animal Spirits that paſs thro' thoſe
“ few Branches; for, granting at the beſt, (with all our *Anato-*
“ *miſts*) that thoſe very few Branches of the *Intercoſtal*, and eighth
“ pair, do enter into the *Heart*, which they never can demon-
“ ſtrate, they would ſtill be inſufficient, to produce the in-
“ credible Quantity of Vital Motion, of which we are not
“ naturally ſenſible: To convince the World, that thoſe *Nerves*
“ do not move the *Heart*, I have publickly tryed the laſt year,
“ the year before, and ſome other years, the following
“ Experiments, *viz.* I laid bare the *Intercoſtal*, and eighth pair
“ of Nerves of both ſides, I made as ſtrict Ligature about
“ them on one ſide as I poſſibly could, to intercept any Spi-
“ rits flowing from the *Brain*, yet I could not obſerve, that
“ the Motion of the *Heart* was any ways hereby retarded; af-
“ terwards I tyed both Nerves on the other ſide, leaving ſtill
“ the firſt *Ligature* bound tite, yet I could not find the *Heart*
“ moved ever the leſs, tho' there could no Spirits arrive from
“ the *Brain* thro' theſe Nerves to it; afterwards, for fear
“ the Company ſhould ſuſpect that the *Ligatures* might looſen,
“ and that the Subtilty of the Spirits might ſtill make its way
“ under each of them, I divided both the *Intercoſtal*, and the
“ eighth pair, firſt on one ſide, as near the *Heart*, and as near
“ the *Brain*, as I could poſſibly; ſo that I took out about eight
“ Inches in length of the Nerves, I mean all their whole
“ Length, from the *Head* to the *Heart*; after which, the Com-
“ pany then expected the Animal could not long continue a-
“ live, yet notwithſtanding, there was not the leaſt Appea-
“ rance of any Weakneſs or Fainting found about him, but
“ he walkt without any *Convulſive Motion*, *Palpitation*, or any

“ other *Diſorder*: Afterwards, leaſt it might ſtill be ſuſpected, “ that the *Intercoſtal*, and Eighth Pair on the other ſide, did “ ſupply the *Heart* with *Spirits*, for continuing its uſual Motion, “ I cut them off alſo as cloſe as I poſſibly could, both near the “ *Head* and the *Heart*; which being done, the Company then “ did not in the leaſt doubt but the *Animal* would infallibly dye, but were afterwards very much ſurpriz'd to ſee “ him walk about the room as little diſcompos'd as before, and “ continued ſo for ſeveral days; which without all doubt had “ hapned otherwiſe, if the motion of the *Heart* chiefly depended on the *Spirits*, that uſed to paſs thro' the *Nerves*; for “ all the *Branches* and *Trunks* of *Nerves* that all our *Anatomiſts* “ aſſert, do carry *Spirits* to the *Heart*, were entirely cut to “ pieces, ſo that there was abſolutely no communication or correſpondence left between the *Heart*, and the *Brain*, or the *Spinal Marrow*; which two laſt are the *Magazines*, out of which all “ parts of the Body are ſupply'd with *Animal Spirits*.

“ Beſides, the firſt motion of the *Heart* in the *Fœtus*, cannot depend on the *Brain*, becauſe the *Brain* cannot ſend Spirits to the *Heart*, before the *Heart* tranſmits blood to the “ *Brain*: I need not mention how the *Hearts* of *Eeles*, *Serpents*, and of other *Animals*, move for ſeveral days after they “ have been taken out of the Body. From theſe *Experiments*, “ I hope our *Learned Phyſicians*, and other *Naturaliſts*, will think “ of ſome other cauſe for the motion of the *Heart*, beſides the “ *Celebrated* and received *Doctrine* of *Animal Spirits*; for my part, “ I am of Opinion, that the motion of the *Heart* depends entirely on the Blood rarified in the *Lungs*, by a mixture of “ *Elaſtick Air* forced into the *Lungs* by *Reſpiration*; and that it “ is this Air, together with the blood conveigh'd from the *Lungs*, “ not only into the *Ventricles* of the *Heart*, but likewiſe by the “ *Coronary Artery*, into its whole ſubſtance that cauſeth the *Syſtole*, “ and *Diaſtole*, or the *Dilatation* and *Contraction* of the *Heart*; “ which perhaps, when I may have more leiſure, I will make more “ evident in a particular Treatiſe of the motion of the *Heart*.

Caſper Bauhine writes, that he opened a Girl, where he found a lump of fat in one of the *Ventricles* of the *Heart*, and her *Cæcum*, and her other Parts, were not poſited in their Natural State.

Veſalius ſays, Lib. 1. Cap. 5. *de Human. Corp. Fabric.* That he found about two pounds of blackiſh glandulos fleſh in the left *Ventricle* of the *Heart* of a Man. And, *Neretus* of *Neretii* Obſ: 155. writes, He ſaw in the *right Ventricle* of the *Heart* of a Woman troubled with a Peripneumony, a Root enated, fleſhy, whitiſh, and flaccid, ariſing out of the *Heart*, and paſſing into the *Vena Cava*, reached even to the *Head* and *Os Sacrum*; and that ſuch a like fleſhy ſubſtance he ſaw ariſe out of the left *Ventricles* of four Perſons who dy'd Peripneumonics: And,

Columbus, lib. 14. *Anatom*, Says, upon tying a Dog down, fit for Diſſection, upon opening his Trunk, ſo as you may take hold of the *Heart*, whilſt one of your Companions having a thread ready to tye up its four Veſſels, and the Ligatures being ſtrictly made, and between which they being divided ſo as you may take out the *Heart*, which being done, looſe him from the place you bound him down to, and you ſhall hear him bark without his *Heart*, and ſhall ſee him walk without it.

And the ſame *Columbus*, lib. 15. *Anatom.* writes, That in *Rome*, he ſaw in a Cardinal he there opened, a very hard Tumor, equalling the bigneſs of an Egg in the *Ventricle* of the *Heart*.

Benivenius, Cap. 63. *de Abditis*, writes of two Brothers of a Noble Family, who living together, a little before Supper a Quarrel aroſe, and in the Engagement, the one ran the other into the Heart, whence followed a great Flux of Blood, which ſo emptyed the Veſſels, that he began to change Colour, grew pale, ſeized with cold Sweats, his Arteries became depreſt, and diverſe Symptoms of Death ſurrounded him; he being ſent for, preſcribed convenient Cordials, and other nouriſhing Liquors, in order to the advancing his Spirits; the Patient in this Condition having worn out near half the night, and expecting every Minute his Change, being by all Perſons judged paſt Recovery; at length, after his ſuffering ſuch a Conflict of Fears, he takes freſh Courage, and by Gods Bleſſing on his Endeavours, he was cured beyond all Expectation, and reſtored to his former Health.

As to the Arteries.

The *Heart* upon every Pulſation, is ſeen to throw forth a good quantity of Blood out of its *Ventricles* into the *Arteries*, as I have already ſaid, whereby they become dilated; which Blood would without all queſtion, be retarded in its Journey, (if not intercepted) did not the *Heart* and *Arteries*, by a joynt Conſent, and conſtrictive Power of their Fibres, fully countermand a Reſiſtance made in the expanded *Arteries*, eſpecially thoſe in the Aſcendent Trunk of the *Great Artery*, and the *Carotid Arteries*, where by its Weight, no ſmall Oppoſition to the Impulſe thereof, is ſent in every *Syſtole*, firſt into the common *Trunk*, then into the *Aſcendent Trunk* of the *Great Artery*: And becauſe the *Arteries* become ſtill narrower, its reaſonable to ſuppoſe, that the Blood cannot be puſht out impetuouſly, without making them ſwell; and when they are thus ſwelled or blown up, they are ſeen to reduce themſelves to their former State, by the ſpring of their Fibres, and hereby make a part of the Blood, which they have taken into the Veins of the *Heart*; and ſince we plainly find, that the *Heart* throws forth the *Blood* into the *Arteries* by various Strokes, the *Arteries* muſt needs hereupon ſwell, and fall off, as they fill or empty themſelves of the Blood thus forced into them; the true Motion of all which *Arteries*, we commonly call the Pulſe, about which it is very obſervable, that the Dilatation of the *Arteries* do attend on the Contraction of the Heart, and that the Contraction of the *Arteries*, do bear Correſpondence with its Dilatation; from all which we may rationally allow, that the *Arteries* have their Coats encircled with circular fleſhy Fibres, ſince that by their Contractions they puſh forward the Blood, firſt made in the left *Ventricle* of the Heart, and thence ſent forwards throughout all its Stages and Circuits.

And tho' *Rolfincius* Lib. *de Def. Anat. Cap.* 1. will not allow the *Arteries* to have any fleſhy Fibres, yet whoever examines the large *Arteries* after boyling, may plainly ſee them, and Reaſon it ſelf convinceth the Truth hereof; for, were they not made firm by theſe *Tranſverſe*, or rather *Circular Fibres*, as they are dilated in Pulſations, (ſo would they keep) were it not by the help of theſe and their Contractions, that a conſtrictive or compreſſive Power is made in the *Arteries*, by which they diſcharge themſelves of their Load, and free themſelves from the Weight of the *Blood*.

The Cauſe of an *Aneuriſm.*

And this I take to be the true Cauſe of an *Aneuriſm*, viz. when the outward Coat of an *Artery* is rent, and its circular Fibres divided, there's nothing can be ſaid to hinder the *Bloods* reiterated Shakings, or prevent the Dilatation of its inward Coat, by reaſon of its Softneſs; and it being not longer able to defend its ſelf againſt the many repeated Pulſations made in it, it at length yields, and becomes ſo diſtended, that it ariſeth into that beating Tumour we commonly call an *Aneuriſm*.

Coiter in Lib. Obſ. Anat. & Chir. writes, That he ſaw the great *Artery* of a Girl become perfectly Oſſeal, and the ſame I likewiſe ſaw at my Brother *Poynters* at *Oxford*, a famous Chirurgeon of that City.

Solonander Cauſ. Med. Sect. 5. *Conſ.* 16. writes of a Biſhop that could not ſtand upright, but was forced to lean for ſome years on his Pulpit; he dying, and his Body being opened, the Great *Artery* was ſeen very hard, both above and below the Kidneys, and as brittle as Glaſs, and his Kell ſtook to his Belly round about it, ſave only at the Navel.

And tho' Wounds of the *Arteries* are not generally cured, yet ſometimes they have been cured; and we may read of *Galen*, lib. 5. cap. 7. *Meth. Med.* acquainting us of one coming to be let Blood in the Spring time, and he that was to bleed him, not being much uſed to the Lancet, or to letting of Blood, inſtead of the Vein, pricks an *Artery*; *Galen* ſeeing the Miſtake, and the Accidents which attended it, preſcribed a Medicine to ſtop the Flux of Blood, which was applyed to the Orifice, and over it a piece of wet Sponge, which he ordered to be kept on for four days; the fourth day the Arm being opened, the Wound appeared agglutinated; and by applying the ſame dreſſings the ſecond time, and rowling it as formerly, and at the ſame diſtance of time, his arm was ſeen perfectly cured.

The *Veins* alſo have *Fibres* allowed them.

Nor are the *Veins* leſs deſtitute of *Fibres* than the *Arteries*, made ſo, both for exporting and importing the blood to every part of the Body; nor is their Energy or Conſtrictive Power leſſer than that of the *Arteries*; they alſo being guarded with Circular *fleſhy Fibres*, as is plainly made good in the Trunk of the *Vena Cava*; about whoſe terminations, in large *Animals*, as Horſes, Oxen, and the like, it is encircled with Annular fleſhy fibres, to prevent its being eaſily rent, and for the better promoting of the Currency of the Blood, by leſſening its circumference, by whoſe contractions of theſe ſtrong circular fleſhy fibres moving inwards, they are made capable of ſending the Blood forwards, towards the right *Ventricle* of the *Heart*.

The ſubſtance of the *Veins* indeed is much thinner than that of the *Arteries*, they being only made of two Coats, outward and inward; the outward fram'd out of many ſmall *Fibres* running in various *Angles*; the inward form'd of Three ſorts, *Right*, *Oblique*, & *Tranſverſe*, finely interwoven, & curiouſly put together: Theſe fibres alſo are ſeen to add ſtrength to the *Veins*, and are of great uſe in high Dilatations; when ever the blood upon any extraordinary Effuſions, ſeems to force its ſelf beyond its uſual Courſe thro' theſe inward Parts, even to the very rending of their *Circular fleſhy Fibres*, by which they become uſeleſs, and not being longer capable of helping themſelves, they ſeem diſpoſed to *Varices*, and appear only as ſtretcht skins, fit only to contain, not capable of longer propelling the Blood, as formerly; and hence do occaſion that rupture in them, which we commonly a *Varix*.

Columbus, lib. 15. Tells us, That with his own Hands he had Extracted ſeveral Stones, which he found in the *Vena Porta*.

Schenkius, Obſ. 8. fol. 399. Writes of one troubled about 11 Years with a continual pain in his *Hip*; who, after many Medicines preſcribed and applied in vain, and the Man near ſtript of all hopes of Recovery; ſome time, by a morbific Matter gathering about his *Knee* of the ſame ſide, his former Pain encreaſed with greater violence and Feaver; but afterwards, adviſing with one *Peter*, who opened the external *Malleolus* or *Ancle Vein*, thence came out not only very hot blood with force and itching, but many ſmall Stones much like Muſtard-ſeed in Figure, and Magnitude, in that plentiful quantity, as would fill a Walnut; by which his many Years Pain, (as it were by one ſtroak) vaniſhed and ceaſed, and was Living when he writ the Story, and was afterwards by his Princes favour taken into the Hoſpital as an Object of his Charity and Clemency.

Another of Dr. Connors *Obſervations of the Coats of the Veins and Arteries.*

" The *Veins* and *Arteries* are not only *Membranous*, as was
" formerly ſuppoſed, but likewiſe *Muſcular*; for they have both
" *Orbicular* and *Longitudinal Fibres*, which ſerve not only to ſtrength-
" en them, but likewiſe by their Contraction, like the *Vermicular*
" *Motion* of the *Guts*, do drive the Blood forwards to haſten
" its Circulation thro' both Channels; and the *Arteries* have their
" *Orbicular Fibres* much larger and more ſpongy than thoſe of the
" *Veins*, becauſe the *Arteries* receiving their *Blood* immediately
" from the *Heart*, and this Blood being in great Motion, they
" need to have ſtrong Coats, not only to reſiſt the violent Dila-

latation of every *Pulſe*, but have Spring enough likewiſe for the forcing forwards of the expanding *Maſs of Blood*: So that I may in a manner call the *Arteries*, not only a *Continuation* of a *Channel* from the *Heart* to all the parts of the Body, but likewiſe in ſome reſpect a *Continued Heart*; becauſe they have a *Syſtole* and *Diaſtole*, and Orbicular Fibres as has the *Heart*, ſo that I cannot reckon the *Arteries* paſſive, in receiving the *Waves* of Blood poured out from the *Heart*, by a Contraction alternative to its Dilatation, but likewiſe active in puſhing the Stream forwards, which makes me differ from thoſe *Naturaliſts*, whilſt, tho' I allow the *Heart* to be the *Primum Vivens*, I cannot grant it to be the *Ultimum Moriens*; I mean, that tho' the *Heart* is the firſt part of the Body that moves, yet I cannot allow it the laſt in Motion; but I muſt affirm, that the laſt Motion in the Body, is that which is found in the *Arteries*, which is further confirmed by a particular Obſervation I have ſometimes made, and which I never yet met with in any *Author*; which is, that I find no *Blood* in the *Arteries* after death, but all the *Maſs of Blood* is diſpatcht from them into the *Veins*, from whence I draw theſe two Concluſions; firſt, in that while we are living, neither the *Arteries* nor *Veins* are half full, ſince the *Veins* alone do contain the whole *Maſs of Blood* after death, and are then ſcarcely full; ſecondly, that after the *Heart* has ceaſed to move, which is called Death, the *Arteries* ſtill do continue their Motion, till they have diſpatcht all the Blood received into them, (even to the very laſt Motion of the *Heart*) into the moſt extream *Capillaries*; and from thence puſheth it forwards into the gaping Orifices of the ſmalleſt *Veins*, ſo that inſtead of allowing the *Heart* to be *Ultimum Moriens*, the *Capillary Arteries* ought rather to have that Priviledge granted them, as I humbly conceive.

Having thus ſhewn the Structure and Uſe of the *Heart*, and the *Arteries* and *Veins*, and how they are to be treated upon receiving Accidents, I next, for the informing of Young Students in Chirurgery, and others naturally delighted with theſe Studies, ſhall in brief ſpeak ſomewhat of the *Liver*, *Lungs*, *Stomach*, *Guts*, *Bladder*, and the like.

Firſt, of the *Liver*.

All the Veſſels entring its ſmall Lobes, do in their Connexions frame the *Liver*; and whereas each Lobe is ſhut up in a delicate Membrane, dividing its ſelf from the reſt, yet it ceaſeth not to intermix with them by ſmall tendinous Fibres, and this Membrane enfolding each Lobe, changeth into a part of the *Capſula*, including all the Veſſels entring into each Lobe; and whereas all theſe Lobes are made of ſmall Vaſcular *Glands* touching one another, each of theſe *Glands* is ſuppoſed to take a Branch of an *Artery*, and of the *Vena Porta*, carrying with it another Branch of the *Ductus Choledocus*, which is nothing more than a Continuation of the Veſſel of the *Gland*; from each of theſe *Glands* comes a Branch to the *Hepatick Vein*, all which being united, do give it a good conſiderable Bulk. And as the *Vena Porta* and the *Arteries*, do conveigh the Blood to the *Glands* of the ſmall Lobes, the Branches of the *Hepatick Vein* are ſaid to carry it away again into the *Vena Cava*, whilſt the *Ductus Choledocus* tranſmits the Bile into the *Duodenum*, which the *Glands* of the ſmall Lobes have ſeparated from the Blood. Thus much for the *Ductus Hepaticus*, and its Ramifications according to *Beddevole*, where alſo you may clearly ſee the tracing of the *Ductus Cyſticus*: In its upper part we find it convex, and concave underneath, it being divided into three or four Lobes, and in its under part, it embraceth the Stomach; ſo that when the Stomach is full of Meat, the Bladder of Gall being then preſt, the Bile is ſeen to paſs out by the *Cyſtick Channel*, and runs in abundant into the *Duodenum*, to diſſolve the Chyle, as it comes from the Stomach: From all which, we may therefore conclude, that the Uſe of the *Liver* is to ſeparate the Bile from the Blood, to perfect the Chyle in the Inteſtines, by diſſolving its Sulphures by *Alcalies*, and by diluting it with its Flegm, as he alſo very well obſerves.

Schenkius, fol. 389. obſ. 7. writes *de Jecore*, of a Body whom he diſſected, was found without a *Liver* and a *Spleen*; and that one Mr. *Matthias Ortelius*, dying on the 11*th.* of *September*, 1564. at *Antwerp*, and his Body being opened by the Phyſicians and Chirurgeons then preſent, and looking under the *Diaphragma* and *Spurious Ribs* for the *Liver* and *Spleen*, there were neither of them to be ſeen in the Body; which Caſe being very remarkable and rare, made me inſert it here.

And altho' it is a general received Opinion amongſt *Phyſicians*, that Wounds of the *Liver* are Mortal; yet, notwithſtanding ſometimes they have been ſeen Cured, eſpecially where Nature is well backt with Art; many wonderful things have been ſeen done, even to a Miracle: As it once happened in a Noble Man, who being Wounded in the Wars, and ſhot into the *Liver* with a Bullet, was given over by the then preſent *Phyſicians* as paſt Cure, the ſubſtance of the *Liver* being therewith hurt; yet notwithſtanding, by ſome of his Noble Friends, he received a Cure only upon preſcribing him ordinary Medicines: So that it is better to obſerve *Cornelius Celſus*'s method, than deſiſt the undertaking, who adviſes to try a doubtful Remedy in theſe Caſes, rather than leave a Cure unattempted. This Story, *Quercitan* relates in his Book *de Vulnerib. Scoplet.* Cap. 2. about the end of it.

And *Fernelius* aſſures us, that the ends of the Lobes of the *Liver* have been cut out without danger of Life; and that, tho' they are very difficult to be Cured, by reaſon of the great flux of Blood which uſually attend them, this Part being plentifully made up, and ſtockt with Blood-veſſels, yet both Reaſon and Experience ſhews that they are not incurable. An Example of which we have in *Hildanus*, Obſ. 34. Cent. 2. where He tells us of one *Helvetius*, about 30 Years of Age, who was Wounded with a Sword in the Region of the *Liver*, which Wound being very large, the Blood ſo plentifully iſſued out, that it made the Patient faint; a Surgeon being adviſed with, having ſearcht the Wound, and endeavouring to ſtop the flux of Blood, a piece of the *Liver* appeared at the Orifice of the Wound, which he Extracted with his Fauceps, and cut it off; and tho' ſome cruel Symptoms ſucceeded this, yet by God's Bleſſing he recovered. About three Years after this, he being taken Ill with a *Feaver*, was received into an Hoſpital at *Geneva* for Cure: When *Hildanus* ſaw him one day with the reſt mentioned in his Obſervation, he cryed out aloud, *Is it not a miſerable thing, that he ſhould then be ſo ſeized with a Feaver, as not to be cured by two Phyſicians, whereas about three years paſt, he had been ſo deſperately wounded on his Side, that a piece of his* Liver *was cut to pieces with a Sword, and extracted, and yet by God's Bleſſing reſtored to his Health by one* Chirurgeon *only?*

Fabritius and his Brethren being amazed at the ſeeing his ſide, in which a Cicatrice had been induced, near a Spans length from the Region of the *Liver*, and he dying a few days after the ſhewing hereof, his Body being opened, a part of the lower Lobe of the *Liver* had been cut away, and a fair Cicatrice ſeen made, as they themſelves ſaw upon examining the *Liver*.

Next, of *Lungs.*

As we have already ſhewn, that the *Blood* doth paſs out of the Right Ventricle of the *Heart*, and enters the *Pulmonary*

Artery, ſo this *Artery* is ſeen divided into many Branches, encircling the Body of the *Lungs*, and afterwards ſubdivided into many Ramifications, till at laſt their moſt minute Bodies are ſwallowed up into the ſubſtance of the *Lungs*. The ſmall Veſſels collected about the end of the *Bronchiæ*, are all wrapt up in one Membrane, which Membrane is nothing more than the continuation of the outward Coat which covers the *Winde-pipe* and the *Bronchiæ*; theſe *Bronchiæ* are every where ſaluted with *Arteries* and *Veins*, whoſe Extremities being expanded into the Coats of the *Veſicles*, do compoſe the Subſtance of the *Lungs*: Now, when we blow into the *Wind-pipe*, we plainly ſee the *Lungs* ſwell, and all the *Veſicles* are filled with Air, whence we may rationally conclude, that there is a Communication between the *Bronchiæ* and the *Veſicles*; and ſince we plainly ſee, that the *Wind pipe* ſhares with the outward Air by the Mouth and Noſtrils, we may hence be ſatisfied, that the whole Frame of either, was made for Conveyance of the external Air, into the *Veſicles* of the *Lungs*; and ſince we find, that the Air enters the *Lungs*, as the Breaſt is enlarged, and goes out as it is compreſt; the true Underſtanding of the Make and Structure of the *Thorax*, will give us the beſt light, how the Lungs are enlarged by the Air's entering into them, and how they are leſſened by its going out thence.

Gemma, lib. 1. *Coſmoſrit.* cap. 6. writes, He hath ſeen the Fibres of the *Lungs* rotted off by *Abſceſſes*, and by Wounds, and yet the perſons have lived.

Petrus Foreſtus, Schol. *ad* Obſ. 37. Lib. 2. writes of a wounded man, who was a *Patient* in the Hoſpital, who had there lain for above a Year and a half, in whom almoſt the whole Subſtance of the *Lungs*, by length of time was converted into *Pus*, and the *Heart* lay naked without any *Lungs* adjoyned to it.

And tho' *Phyſicians* do dayly report, That Wounds of the *Lungs* are incurable, yet *Rulandus*, Chir. lib. 3. cap. 25. tells us, That by Gods Bleſſing, being call'd to the *Patient* on the fifth or ſixth day after the *Wound* received, he found part of the *Lungs* come out between the *Ribs*, which by the Concourſe of the Spirits and Humours there made; ſo ſwelled up the part, that it could not be reduced again, ſo that the Nutriment being denyed it, the outward parts became mortified, and *Worms* bred inwards; the chief Chirurgeons of the place being conſulted,

ſulted, they left him for dead; he being afterwards ſent for, made a Circular Inciſion into the *Cutis* about the Wound, the length of a Nayl of the little Finger, and with it, cut off the part of the *Lung*, which hanged out of the Wound, and by ſtopping the Flux of *Blood*, and his Application of convenient Medicines, cured his Patient.

Of the Stomach.

The *Oeſophagus* or *Gulet*, being framed like a hollow Pipe, or Neck, is implanted into a Bag, not much irreſembling a *Bag-pipe*, and this is that which we commonly call the Stomach, it being allowed it ſeveral Membranes and Fibres, the outward and inward whereof, being formed of tendinous Fibres, and its middle of carnous Fibres; and when ever we examine its middle Coat, we uſually find three degrees of Fibres in Beaſts, and but two in men; the firſt being a Continuation of the longitudinal Fibres of the *Gulet*, and theſe extend themſelves from the upper Orifice of the *Stomach*, as far as the *Pylorus*, and the other is no more, than the Continuation of the Circular Fibres of the *Oeſophagus*, which are interſected by the longitudinal Fibres at right *Angles*, as *Willis* obſerves; all theſe Fibres are made to produce a Periſtaltick Motion in the Stomach, by which Motion, the Victuals which we take into our *Stomachs* by the upper Orifice, are ſent out by the *Pylorus*.

Various are the Forms, Subſtances, and things found in the *Stomach*, ſome being ſeen to congeal therein, ſo far as to form Stones in it; and *Cardanus*, Cont. 9. Lib. 2. Tract 5. writes, That he diſſected two, in whoſe *Stomachs* were found Stones, the largneſs of a Hens Egg, both which cauſed intollerable Pains in the *Patients Stomachs* while living; and *Geſner*, Par. 1. Cap. 12. Lib. *Foſſil.* writes, That a Friend of his, an expert *Anatomiſt* found ſeveral hard and round Stones of a whitiſh Colour in the *Stomach* of a Man at *Norimberg*; and *Gemma*, Lib. 2. *Art. Cicl.* Pag. 76. writes, He has by him Stones taken out of the *Stomach*, *Bladder* of *Gall*, and *Heart*.

Borellus, Obſ. 66 Cent. 1. writes of a *Beggar* walking and begging about the Streets, who had an *Ulcer* for many years in his Stomach, which he cloſed up, by putting a Tent into it, after he had let out any Chyle from it, which is a thing of no ſmall Remark, in that *Ulcers* of the membranous parts are ſcarce curable without great Difficulty, but that which was more ſtrange, that this ſhould be ſo long kept open, and yet at length be healed.

Chr. à Vega, Com. ad Aph. 18. *Lib.* 6. *Hip.* tells of a Chirurgeon of Reputation, who cured a Wound in the Stomach, through which the chewed Meat paſt not long before with the Chyle.

Stupendous alſo is that Story of *Oſualdus Crollius*, p. 60. which he tells of a Country Fellow at *Pragne*, who ſwallowing a Knife into his *Stomach*, had it afterwards cut out, and cured by a Chirurgeon.

Of the *Guts*. The *Guts* are made up of three Coats, as is the *Stomach* and the *Gulet*, in every reſpect, and are allowed to be ſix in Number, three ſmall, and three great; the firſt called *Duodenum*, the ſecond *Jejunum*, beginning where the firſt ended, and ends where the Excrements begin; the third *Ileon*, the fourth *Cæcum*, being only the ſmall end of a *Gut*, faſtned to the reſt; the fifth *Colon*, and the ſixth the *Rectum*; and ſince no parts of Humane Body comes under more Miſchances, or are ſo often wounded, as the *Guts*, eſpecially upon Duels, by *Whore maſters* for their *Miſtreſſes*, or by *Gameſters* upon their loſing their *Money*, ſo are they to be managed according to Art, elſe the Patient goes off ſuddenly; for theſe parts are ſeen readily to run into Putrefaction, they being always filled and bedewed with Humours; and if the Air once gets into them, ſo as to penetrate their Subſtances, they readily ſeem to ſwell, and the *Blood* thickens, being hereby pincht, which gave 'em both Life and Warmth, when ever it becomes expoſed to the Air, is ſoon ſeen deprived of its Motion, whence it naturally gangrenates and mortifies the part, whilſt other times an Inflammation alone, is ſometimes ſeen the Fore-runner of the ſame, as well in theſe parts, as in others: Now, that the Inteſtines are ſeen frequently puft up with Wind, ariſing from an Inflammation, which the Wound does ſoon communicate to the *Gut*, and the *Air* obſtructing the Pores, and the Reflux of the *Venal Blood* being hereby ſtagnated, hence muſt conſequently follow a Strangulation; when ever therefore an Inflammation enters a *Gut*, which not being able to carry it off, by reaſon of the Air ſtopping the Paſſages, and locking up the Pores of the Inteſtines; this cannot be honeſtly ſuppoſed to receive any Cure, but by the Chirurgeons dilating the Wound, and enlarging the Orifice, for the readier diſcharge of what is inwardly contained. And whereas nothing is ſeen to help forwards the Cure of Wounds of theſe parts, more than good Diet, and that every one knows there is no greater Enemy hindring their Cure, than Motion, the Chirurgeon is hence therefore adviſed, as he obſerves the firſt, that he forgets not the ſecond; for as Dyet does in a great Meaſure leſſen the Action of the *Guts*, ſo Reſt does bring the *Lips* of the Wound to an Encloſure; and this they do, either by Knitting the wounded parts to the *Peritonæum*, or ſome of the other inward parts: In theſe Caſes, Clyſters are alſo very proper, in that, as they do relax the Fibres, and carry off the Matter, and refreſh the Parts; ſo likewiſe in form of a *Bath*, they both repreſs, and becalm the Motion of the *Blood* and *Spirits*.

Columbus tells us, Lib. 2. Cap. 6. *Coſm.* of a *Woman* who after having been troubled with direful Pains in her *Stomach*, had a *Triangular Stone* excreted by her *Guts*, the bigneſs of a *Cheſnut*, which was ſuppoſed to have been lodged for a whole year in her *Pylorus*, as the Nature of the Antecedent Symptoms demonſtrated.

Albucaſis, Lib. 2. Cap. 5. *Meth.* ſays, That he ſtitcht up a *Wound*, made into the *Belly* of a Man with a *Pen-knife*, which was the breadth of the Palm of a Hand, by which came forth the *Guts*, which hung out two Handfuls beyond it; yet theſe being reduced, the *Wound* in fifteen days was perfectly healed, and the Man lived many years after it.

Gemma. Lib. 1. Cap. 6. *Coſm.* writes, That he ſaw ſome pieces of the ſmall *Guts* rotted off by *Abſceſſes*, and by *Wounds*, and yet the Perſons lived; and *Hollerius* writes, *Obſ.* 17. *Lib. Prop.* of one who with a ſharp-pointed Sword, was run into his ſmall Guts, as alſo wounded the great Guts, and the Excrements came out by the *Wound*; and tho' every one deſpaired of his Recovery, yet he received a very good Cure.

Jacotius, *Com.* 2. *ad Aph.* 17. writes, That tho' its aſſerted by all *Authors*, that the *Inteſtinum Jejunum* when ever wounded, is certainly incurable, by reaſon of the large Veſſels allowed it, and the thin Coat it is ſeen to have, it being moſtly framed of a nervous Subſtance, and alſo a near Neighbour to the *Liver*; yet ſometimes, this has been ſeen to receive a Cure when wounded; And all the great *Guts* are ſo frequently known cur'd when wounded, that there needs no farther Examples of them in this Diſcourſe.

This you have with the Stomach, Heart, Lungs, *and the various* Fibres *of the* Heart, *at* Tab. XIII. Fig. I, II, III, IV, V, & VI.

Detruſor Urinæ, or the Urine's *Diſcharger.*

This diſchargeth the *Urine.*

AS Man hath *Kidneys* allowed him, as proper *Colatures* or Strainers of his Blood; ſo hath he given him a *Bladder*, as an uſeful *Repoſitory* or *Receptacle* to keep in his Urine, till it becomes ſo full, that it unloads its ſelf of its Burthen; and for this Reaſon, *Provident Nature* hath placed the *Bladder* with its Bottom upwards, and its *Neck* downwards, and allowed it proper *Muſcles*, both for promoting the Urines Excretion, and others for preventing its involuntary *Egreſſion.*

This by moſt *Anatomiſts* is allowed the firſt proper Membrane of the *Bladder*, whoſe fleſhy Fibres embracing it on every ſide, are ſeen compreſt or contracted, in our making of *Water*; and therefore it is very fabulous what ſome *Phyſicians* do contend for, that beſides this, and the following, many other *Muſcles* are allowed the *Bladder*; but we having no Authority to confirm this their Conceit, do admit of no other than this and the next: This being only as the middle Coat of the *Bladder*, formed out of carnous Fibres running lengthways, helping forwards the Urines Excretion, contrary to the others, which being Tranſverſe, are as properly ſaid to hinder the involuntary Egreſſion of the ſame.

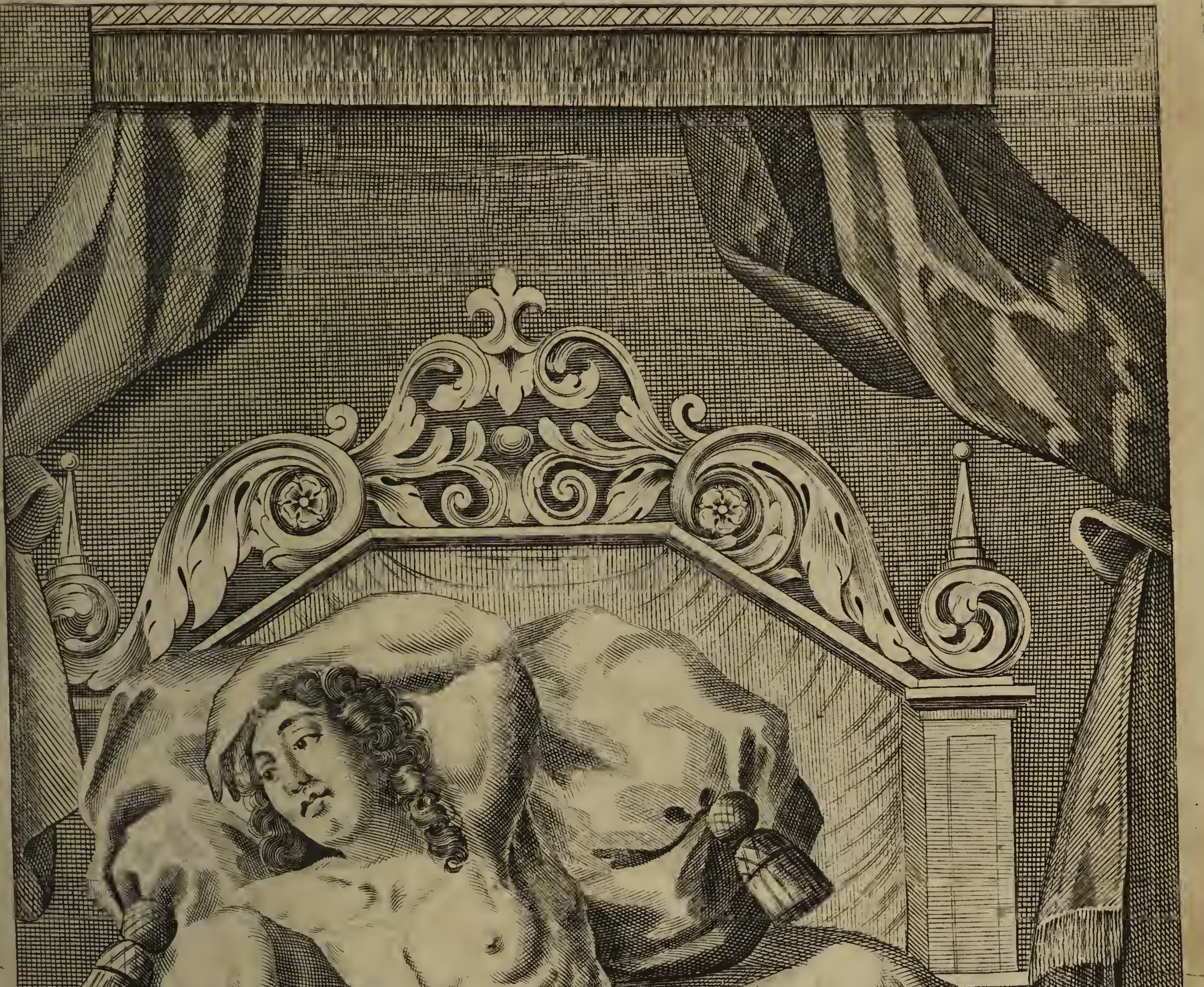
This is a part variouſly attackt with Diſeaſes, and ſometimes ſeen deſperately wounded; and tho' many and large *Wounds* have been made into the *Bladder*, yet the *Patients* have been cur'd; ſeveral Examples of which, I ſhall here mention to confirm my Aſſertion.

That its *Neck* is always cut into, in thoſe troubled with the Stone, every *Lythotomiſt* will allow, when ever he makes his Operation; and altho' its inward Coat is nervous, yet its outward being Muſcular, (that is, being framed out of carnous Fibres) I ſee nothing that may hinder any *Wounds* healing, which may happen in this part.

Wounds of the *Bladder* cured.

P. Borellus, *Obſ.* 4. *Med.* writes, of a *Shepherd* being deſperately wounded, and falling on the Ground, his *Adverſary* ſtabb'd him into the Body with a large Knife, and afterwards into his *Perinæum*, making a wound ſo large therein, that half the body of the *Bladder* was cut through, his Urine continually paſſing thro' it; and yet the Man being naturally of a healthful Con-

TAB. XIIII.


Glans
Penis in Situ
Erectores vrethræ
idem
Accelaratores
Ejaculatores
Sphincter Ani

ſtitution, and by obſerving a regular Courſe of Diet, and applying *Arceus's* Liniment to his Wound, he was perfectly Cured by one *Godde* an Eminent Chirurgeon, as the Story relates: So that *Hippocrates's* Aphoriſms are not ſeen always to carry truth in them, which *Galen* makes good by an incredible Spectacle of a Young Man in *Smyrna*, who having received a wound in the Fore-part of the Brain, was notwithſtanding Cured. That alſo of *Cabrolius*, is worthy our Obſervation, which he writes of a Country Fellow, who having had a part of his Brain cut out with his Wound yet was notwithſtanding cured thereof.

There are alſo many other Obſervations which do prove Wounds of the *Bladder* Curable, which I omit to prevent prolixity.

And ſince I have toucht upon Wounds, both of the *Heart*, *Arteries*, *Veins*, *Lungs*, *Liver*, *Stomach*, *Guts*, *Bladder* and the like, it will not be amiſs to mention ſomewhat here which *Fabritius Hildanus* writes in *Obſ.* 32. *Cent.* 1. about Laughter, where he ſhews that immoderate Laughter in large Wounds is very prejudicial to the Patients, and therefore to be cautioned againſt by Chirurgeons, which he thus farther explains with this following Annotation.

Laughter is the effect of the *Heart*, and in Extraordinary Laughter, not only the *Heart*, but the *Pericardium* alſo is much moved with it, and is both variouſly contracted and elevated out of one place to another, as the Wiſe Phyloſopher and Phyſician *Laurentius Joubertus* and Experience teſtifies.

The ſame may be ſaid upon every other Paſſion of violent Motion, (*viz.*) Fear, Anger, Sorrow or the like, all which have power enough in them to alter the habit of the Patient, and ruffle and diſcompoſe him in his Temper, *&c.*

And becauſe the *Pericardium* is tied to the *Mediaſtinum*, and *Diaphragm*, in a violent Laughter the *Diaphragma* is violently moved; and whereas the *Diaphragm* is alſo annext to the *Lumbal Vertebres*, and to the extremities of the baſtard *Ribs*, and to the lower part of the *Sternon*, and *Enſiformal Cartilage*, as alſo in its lower part to the *Peritonæum*; and as the *Pleura* inveſts the upper Parts with Membranes, hence it is, that in violent or extraordinary Laughter, both the *Pectoral Muſcles*, with thoſe of the lower Belly, are ſeen both to be agitated and contracted at once; in this violent motion alſo, the *Muſcles*, both of the *Diaphragm*, and the *Pectoral Muſcles* moving the *Arm*, are both agitated and ſhaken; firſt, the *Muſcle* bringing the *Arm* to the *Breſt*, and lifting the *Arm* up, then alſo the *Nerves* therein Inſerted, and the Tendons thence produced, are every of them contracted and agitated; and hence is it that we uſually find, when Men Laugh violently, or ſeem to be heartily Merry, (as we commonly phraſe it) they are frequently ſeen to bring their *Arms* to their *Breſts*.

And becauſe the *Muſcles* moving the *Head* and *Neck*, do partly ariſe from the *Os Pectoris*, it is neceſſary, that the *Head* alſo ſhould be moved in violent Laughter, by the agitation of the *Diaphragm*, and *Pectoral Muſcles*; hence is it alſo, that thoſe who are given to extraordinary Laughter, are ſometimes ſeen to bow their *Heads*, ſometimes backwards, and ſometimes either to the right or left *Arm*.

And ſince alſo there is a conſent between theſe Parts, and the *Muſcles* of the *Belly* and the *Legs*, it's oft ſeen in extraordinary Laughing, that theſe merry People do bow themſelves inwards; in that, when the *Abdominal Muſcles* are raiſed by a ſtrong Elevation of the *Diaphragm*, the *Muſcles* of the *Legs*, and the *Veins*, *Arteries* and *Nerves*, which are inſerted into them, muſt conſequently be raiſed with them: Hence it is plain, that extraordinary Laughter in all Wounds (eſpecially in large Wounds) is very dangerous, for the Reaſons before-mentioned, and in Wounds of the *Nerves* in a more particular *manner*, in that it produces very ſharp *Pains* in them, *Convulſions* in the *Veins*, and *Hæmorrhages* in the *Arteries*.

Sphincter Veſicæ, or the *Bladders Cloſer*.

This cloſeth up the urinary *Bladder*.

THE Neck of the *Bladder* being very fleſhy, is furniſhed with many *Tranſverſe Fibres*, or rather *Orbicular* fleſhy *Fibres*, which do contract it, whereby the involuntary Diſcharge of the *Urine* is prevented.

Borichius hath many curious Obſervations concerning theſe Fibres writing, that they do leſſen the Urinary Paſſage, and that this *Sphincter Muſcle* being framed of different fibres, is as an *Antagoniſt* to the *Tonick Motion* of the *Oblique*, *Tranſverſe*, and *Right Fibres* belonging to the *Body* of the *Bladder*; whereby the fibres planted in the ſeveral Coats of the *Bladder* are drawn into Motion by Conſent, according to the Action of the nervous Fibres of the inward Coat, making their various Contractions, leſning its Cavity hereby, and forcing the Urine contained in it towards its Neck, whereby the Fibres of this *Sphincter Muſcle* being relaxed, the *Paſſage* is made open, and free for the diſcharge of the *Urine*; this is allowed to be planted in the upper part of the Neck of the Bladder, not far from the *Proſtrates*, or *Corpus Glanduloſum*: And ſince I have altered my ſixth *Table*, and added the whole *Penis* to it, with this *Glandulous Body*, we ſhall ſpeak ſomewhat of the laſt, here in this place.

Of the *Proſtrates*, or *Corpus Glanduloſum*.

The *Proſtrates*, ſo formerly called by the Ancients, are nothing elſe but a ſpongy Body well ſtockt with variety of *Glands*, wherefore by *Veſalius* and *Regn. de Graaf*, it is called *Corpus Glanduloſum*, its Magnitude for the moſt part not exceeding the bigneſs of a *Wallnut*, ſeen leſſer in Aged *People*, and in thoſe not given to *Venery*, but larger in thoſe given thereto, both before and after Coition; for then the ſpongy part of this Body is ſeen to ſwell with a wateriſh Kind of Liquor, which makes it diſtend in a great Meaſure: If we examine its inward part, we may plainly ſee, that there are many *Hydatides*, or wateriſh *Glands*, diſcovering themſelves in its ſpongy part, which being ſqueezed or compreſt, do diſcharge themſelves into thoſe *Ducts*, which ends in the *Urethra*, as *De Graaf* very well obſerves. It has a double Subſtance, as being both *Glandulous* and *Spongy*, every where covered over with a ſtrong *Membrane*, which has many fleſhy Fibres, ariſing from the Urinary Bladder, primarily for this end, that its Body (when occaſion requires) may the readier be conſtringed, for the expelling thoſe Humours ſeparated from the Blood, which were contained in it.

Its Uſes have not a little puzzled the Thoughts of the *Learned*, ſome ſuppoſing that the *Semen* coming from the *Teſtes*, to be better elaborated here, whilſt others write, that in this part, a ſharp Humour is ſeparated from the Blood, for raiſing a greater Delight and Titillation in the venereal Act; others again on the contrary do think, that this doth produce an Humour, fit for bedewing of the *Urethra*, by which it may ſeem to prevent the Acrimony, either of the *Seed* or *Urine*, or its Drying; of this you may read more at large in *Regnerus de Graaf*, to which I recommend you.

Dr. Cockburn's *Obſervation about* Claps.

I Lately receiv'd this following Obſervation from my Worthy Friend Dr. *Cockburn*, about Claps, which by his directions I here Inſert.

"In his Book of Sea-Sickneſs, *Pag.* 164. He obſerves, That "the Nature of Gonorrhæas, and the Seat of that Diſeaſe are "quite different from what they are commonly believed to be, "which he there proves by two very familiar Arguments, and "that its Ilneſs has not its Riſe where moſt *Authors* ſuppoſe; "but that it is maintained after a different manner than what "they Alledg, tho' he did promiſe to evince his own Opinion, "there hinted by him, even evidently, and to a demonſtration, "which cannot be done in an Obſervatory way, and amongſt "Hiſtories of Medicine; and therefore at this time he only "intends to relate ſomewhat new, both to himſelf and to o"thers alſo, as he ſuppoſeth; where he relates of a Sea-Man, "who dying of a violent Feaver, commonly by Phyſicians al"lowed malignant, after he had been 12 days perplext with a "running; and after having laid open the *Penis* on one ſide "of the *Urethra,* to prevent any hindrance of his diſcoveries, "and the Parts not being ſullied by the Blood that attends any "other way of cutting open the Yard, he found the whole "paſſage of the Urine retain its Natural ſmoothneſs, excepting "about half an Inch farther than the *Glans*; and in all that "way, but eſpecially in the lower Part, it was very rough, "and exactly turn'd up like the fine holes of a Nutmeg-grater. "From theſe Roughneſſes and Inequalities he preſumed that "the Matter of the Diſeaſe did flow: He not pretending to "bring into this place the Improvement which was made by "the Experiment, nor the collateral Arguments with which "he endeavour'd to ſtrengthen his former Hypotheſis, doth "rather chooſe to hint, that the Parts, where the *Glans*, and "*Yard* do joyn, are always the moſt notoriouſly Ulcerated, and "that theſe fretted, and grated Cells are of Irregular, tho' ge"nerally of pentagonal Figures, and filled with that ſort of "ſtuff of the running, as he once Obſerv'd by the help of a "Microſcope in a Patient of his, which he hapned to ſee in "the latter end of his Life, and of a third fluxing he had un"dergone for a very gentle Clap. This Obſervation he ſup"poſes to give a mighty clearneſs into this obſcure and pre-

'carious affair, tho' he is of opinion that every other circum'ſtance in this Diſeaſe fairly laid for our conſideration, does 'as evidently diſcover the common *Miſtake*; but this is neither 'the proper time or place to run the Parallel; ſo that he con'cludes, that ſince there are plainly ſo many Ulcers, ſo many 'ſmall Emiſſaries made in the Blood-veſſels of the Yard, that 'are fit to tranſmit the Parts of that Liquor that are propor'tioned to the Diameters of theſe holes, and theſe in ſuch a 'length only, that theſe are conſequently the fountains of this 'afflux of corroſive Matter, without alledging places that are 'not ſo well ſeconded by *Experience* or *Reaſon.*

Petr. Borell. Obſ. 20. *Med.* Tells us of a *Girl* who lived 15 days after her Birth; and being dead, and opened, many things hapned to be ſeen in her worth our Obſervation; for firſt, ſhe had two *Bladders* in her *Hypogaſtrick Region*, diſtant half a fingers breadth from each other, into either of which one of the *Uriters* was directly Inſerted; Her *Uterus* took up the place of an *Inteſtine*, and the *Rectum* was put over it, and obtained the place of the *Bladder*; her *Navel* was lower than uſual, &c.

This you have at Tab. VI. Fig. I.

Sphincter Ani, or the *Fundaments Cloſer.*

THIS from its uſe is called both *Sphincter*, *Conſtrictor* or *Orbicularis*, it being annexed to the lower *Margent* of the *Os Sacrum*; it ariſing thick, large, and fleſhy, furniſhed with many *Annular Fibres*, enwrapping the *Anus*, it being roundiſh, and broad, circularly joyning himſelf to the *Rectum*, near two Inches in breadth, and is ſo cloſely annext to the *Cutis*, that it is ſcarce ſeparable from it; and therefore by ſome *Anatomiſts* is called *Cuticuloſus*, and *Cutaneus*; this being contracted, doth purſe up, and cloſe the Perforation of the *Anus*, whereby it gives a ſtop to the involuntary egreſſion of the *Excrements*, for which piece of Service, *Nature* hath planted this *Conſtrictor* here as its proper *Officer*.

This keeps in the *Excrement.*

Riverius, *Obſ.* 391. writes, of a *Gentleman*, who as oft as he went to ſtool, voided Stones with his Excrement, of an uneven pointed Superfecies, for many Years together, not much unlike thoſe which uſually are diſcharged through the *Uriters* from the *Kidneys.*

As a common Obſervation among thoſe troubled with the Stone, we uſually ſee when any Fit ſeizes them, they for the moſt part have the falling down of the *Rectum* come along with it, eſpecially upon their ſtraining to make Water.

Annotat. *Ant. Guaynerius Tract. de Colic. paſs. Cap.* 1. writes, That the Stone may be bred in any part of the Body, as in the *Stomach*, *Lungs*, *Guts*, &c. and that he ſaw in a *Country-man*, not only one Stone as big as a *Nut*, but many Stones bred in the *Guts*, and Diſcharged thence. *Braſavolus* tells us, That he ſaw five Stones taken out of a French Womans *Guts*. And *Valieſcus* writes, That he Extracted a very large Stone out of the *Rectum*. And I know a Perſon of Honour in this Town, who every time he goes to ſtool, diſcharges diverſe ſmall Stones with his Excrement.

This you have at Tab. VI Fig. II. & *at* Tab. XIV.

Elevatores Ani, or the *Raiſers* of the *Anus*.

This draws the *Anus* upwards.

THESE are allow'd to ariſe from the Ligament of the *Os Sacrum*, as alſo from part of the *Coxendix*, from which places they do take their dimenſions, and then deſcending down to the *Sphincter*, and lower Part of the *Rectum*, are Inſerted at its lower end into each ſide of the *Anus*.

Theſe are beſt ſhewn before you remove the *Rectum*, *Veſica*, and adjacent Parts, their chief uſe is ordain'd by *Nature* to keep the right *Gut* in its due Place, and to reduce it when it is forced down by any violent Expulſion or Straining in making Water, or in fits of the Stone.

Hiſtory. *Gerhardus Lib. de Calculo*, writes, That he ſaw one at *Antwerp*, who after having made his Inciſion, he found a large Stone lodg'd between the *Rectum*, and the *Neck* of the *Bladder*.

Salius Annotat. Cap. 79. writes, That Experience hath taught that the *Collick* Pain has been cauſed from a Stone bred in the *Guts*; and he knew one ſo deſperately troubled with it, that his Pains could no ways be removed till he diſcharged a Stone by his *Fundament*.

And *Peter Foreſtus*, *Schol. ad Obſ.* 26. *lib.* 14. writes, of one being for a long time troubled with the pain of her *Stomach*, and her *Belly*; after his given her ſome *Pil. Alephang.* and *Maſtich*, ſhe diſcharged a *round Stone* by her *Guts*, the bigneſs of a *Pigeons Egg*, which he ſaw.

And *Crato* in *Epiſt. ad Jordan*, writes, That he ſaw many Stones excreeted from the Body of a Prieſt, by the *Guts*, as big as *Cheſnuts*, whoſe Pains were like thoſe of the *Collick*, and *Iliac Paſſions*, who lived many Years after it.

This you have at Tab. VI. Fig. II. *with the* Rectum, *and the* Corpus Veſicæ.

Lecture IV.

In which are Contained theſe following *MUSCLES*, viz.

- *Trapezius,*
- *Levator Patientiæ,*
- *Rhomboides,*
- *Latiſſimus Dorſi,*
- *Serratus Poſticus Superior,*
- *Serratus Poſticus Inferior,*
- *Splenius,*
- *Complexus,*
- *Recti Majores,*
- *Recti Minores,*
- *Obliqui Superiores,*
- *Obliqui Inferiores,*
- *Tranſverſalis Colli,*
- *Spinalis Colli,*
- *Sacrolumbalis,*
- *Sacer,*
- *Semiſpinatus,*
- *Longiſſimus Dorſi,*
- *Quadratus Lumborum.*

Trapezius, or *Cucullaris.*

THE firſt Name it takes from its *Geometrical Figure*, and the ſecond from the Reſemblance it carries with a *Monks Hood*: The *Scapula* being made as *Natures Buckler*, formed in a *Triangular Figure*, and inwardly exſculpt with a concave Surface, and with a convex one outwards, was truly made for the Inarticulation of the *Shoulder*; to which are allowed Variety of *Muſcles*, faſtning the *Scapula* to the *Ribs* and *Occiput*, to which it is annexed; as alſo to ſome *Spines* of the *Vertebres* of the *Neck*.

This moves the *Scapula* variouſly.

This with its Partner covering the Back, does very well repreſent the Figure of a *Monks Hood*, it ariſing fleſhy from the lower part of the *Os Occipitis*, and Tendinous from the

Apex of the *Spine* of the laſt *Vertebre* of the Neck, and from the 8th: or 9th. upper *Spines* of the *Thorax*; and then narrowing its ſelf, is inſerted into the whole *Spine*, and broader part of the *Clavicle*; and according to its various Originations, and Diverſity of Fibres which are allowed it, it brings the *Scapula* obliquely upwards or downwards, or directly backwards according to its Diverſity of Fibres, imployed in their Contractions.

Annotat. Divide this *Muſcle* from its Partner at their Originations, from the Spines of the *Vertebres*, and tracing it clear from the *Os Occipitis*, the *Muſcles* underneath them, will with great Eaſe ſhew themſelves.

Hiſtory. *Ferrandus Sen. Lib. de Nephrit. pag.* 8. writes, That in the Year 1567, upon opening of a dead Body, he found a large *Tumour* in the left *Scapula* in the inner part, of which was contained a very large *Square Stone*, bred there from coagulated Blood, which he took thence.

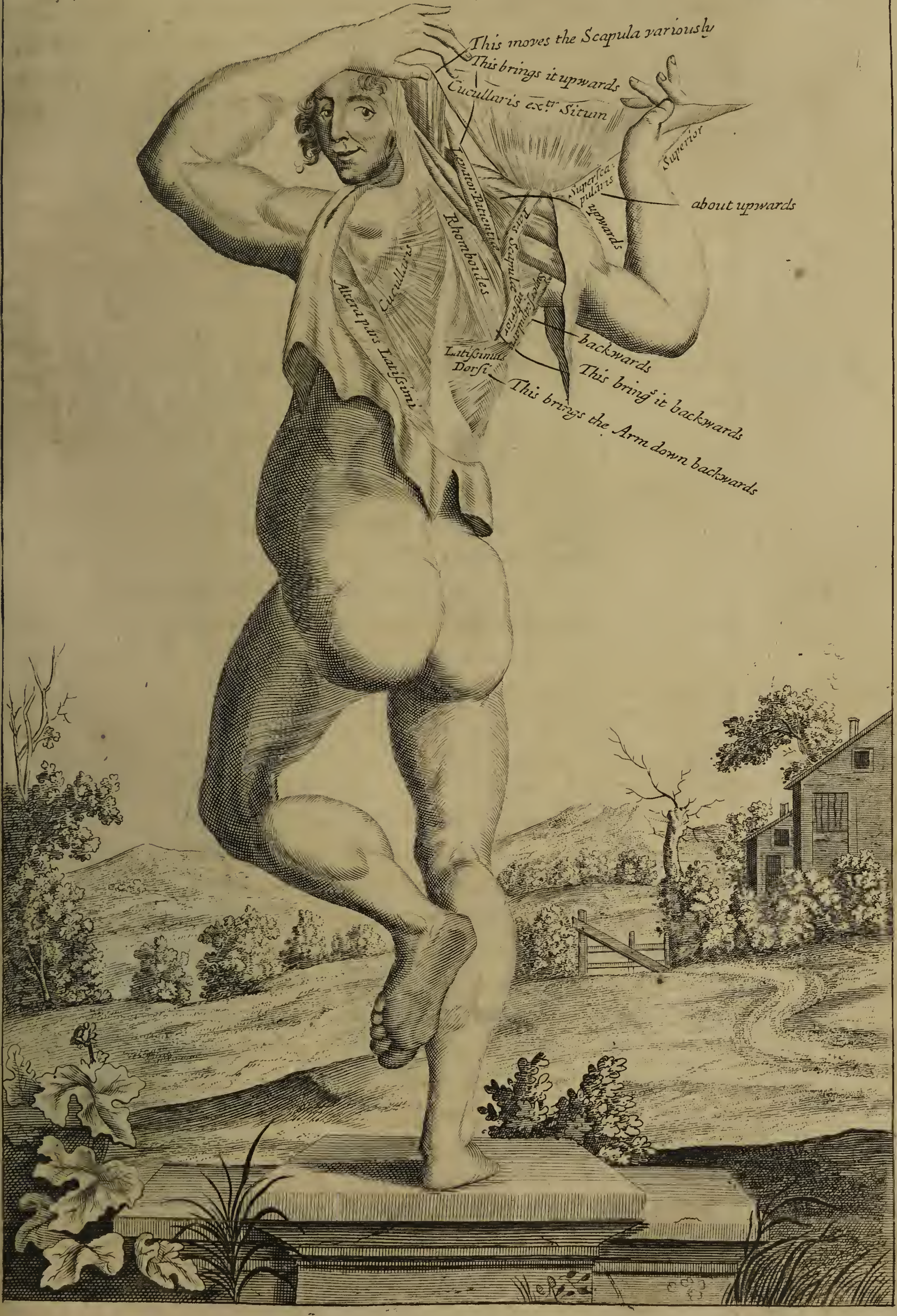
This you have at Tab. XV.

Levator Scapulæ, or *Patientiæ*.

This brings it Upwards. THE firſt Name it has from its Uſe, in raiſing the *Scapula* and *Patientiæ*, from the Uſe *Porters* make of it, in carrying their Burthens; this immediately laying under the former, (as *Diemerbroeck* obſerves) doth ariſe from the ſecond, third, and fourth, and ſometimes from the fifth *Tranſverſe Proceſſes* of the *Vertebres* of the Neck, which joyning in one large fleſhy Body, fixeth it ſelf with a broad and fleſhy *Tendon*, into the upper and elated part of the *Scapula*, bringing it upwards and forwards, as alſo the Arm with it.

Fabritius Hildanus, *Obſ.* 78. *Cent.* 6. writes of one, who on the 12th. of *December* 1602, had been ſhot, and had his right Arm wounded; and the Bullet being cut out about his left *Scapula*, the Wound afterwards became ſo ſordid and fetid Ulcer, that it was not to be cured by Chirurgeons; the Man coming about a year after he received the Wound to him, upon his Dilating the ſinewous and cunicular Ulcer, beſides Splints of Bones, he found two ſpongy Tents, which had been left for ſome Months in a certain Cavity of the Ulcer, by the Inadvertency of the former Chirurgeons; which being extracted, he was

Prælectio Quarta TAB. XV



was wholly reſtored, and lived many years without any Deprivation of the Action of his Arm, altho' ſome part of the upper Proceſs of the *Scapula*, which we uſually call *Roſtrum Porcinum* was exempted; by all which we may ſee, that Nature will not admit ſo much as a piece of Sponge to lodge in any part of the Body, altho' its ſofter than Silk.

This you have at Tab. XV. *and at* Tab. XX. *it is laid bare.*

Rhomboides.

This brings it Backwards.

THIS hath its Name from its Figure, and affixeth the *Scapula* to the Neck, and the back parts of the *Trunk*, it ariſing thin, broad, and quadrangular, and fleſhy from the *Spines* of the three lower Vertebres of the Neck, and the upper of the *Thorax*, whence obliquely deſcending, it becomes thick and fleſhy, being inſerted into the outward *Baſis* of the *Scapula*, which it draws ſomewhat upwards and backwards,

Annotat.

In raiſing this Muſcle, you muſt take Care, that you do not bring up the *Tendon* of *Serratus Poſticus Superior* with him, it joyning its ſelf very cloſely to it, and laying juſt under it.

This is commonly ſaid to bind the *Scapula* to the *Back*; and hence it is, that in old people, and conſumptive perſons, their *Scapulaes* are ſeen ſo prominent, which uſually happens, from either the Weakneſs or the Witheredneſs of this Muſcle.

Hiſtory.

Ambroſe Parry. lib. 14. *Cap.* 9. writes, if a Fracture happens in the *Neck* of the *Omoplate*, or in the *Diarticulation* of the *Arm*, they ſeldom are Cured; an Example of which, he tells you ſucceeded in *Anton. Bourbone King* of *Navarr*; in that about this *Dearticulation*, there are planted many large Veſſels, both *Veins*, and *Axillary Arteries*, and *Nerves*, ariſing from the *Vertebres* of the *Neck*, which are diſtributed into all the *Muſcles* of the *Arm*; where if ever any *Inflammation*, or *Putrefaction* ariſe, it communicates the ſame immediately to the *Heart*, and other principal Parts, which ſharing with it, they ſummon in a train of direful Symptoms, and oft times prove the conſequence of Suddain Death.

This you have at Tab. XV. & *at* Tab. XIX.

Latiſſimus Dorſi, or *Ani Scalptor.*

This brings the *Arm* down Backwards.

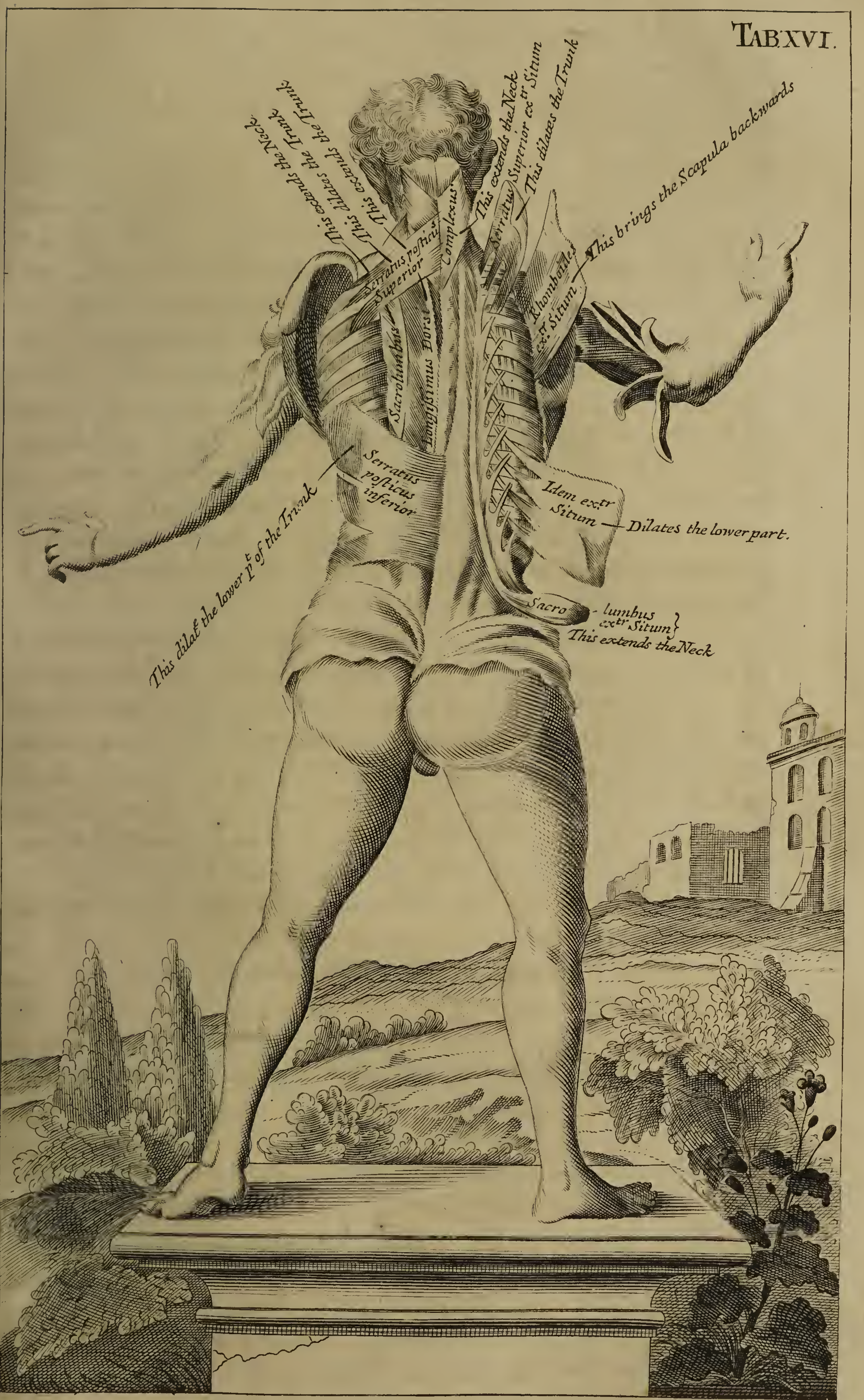
THIS hath its firſt Name from its largeneſs, and the other from the Uſe ſometimes made of it; it ariſing with a broad, thin, and membranous beginning from the *Apices* of the lower *Spines* of the *Vertebres*, between the *Os Sacrum*, and the *6th. Vertebre* of the *Thorax*; and ſometimes it is ſeen to take its Origination from the upper part of the ſaid *Os Sacrum*; and growing fleſhy, is implanted into the *Baſis* of the *Scapula*; from whence by ſome *Anatomiſts* it is thought to receive its chiefeſt part of Fibres, and by a ſhort, and ſtrong, but broad Tendon, is implanted beneath the upper Head of the *Os Humeri*, between the *Pectoralis*, and *Rotundus*, it bringing the *Arm* down backwards, and ſometimes ſomewhat upwards, or downwards, as its Courſe of fibres are variouſly employed and contracted.

Annotat.

Great care muſt be had in raiſing this *Muſcle* from its Origination, leaſt with it, you do alſo raiſe the Origination of its Subjacent *Muſcle*, *Serratus Major Poſticus*; if you be not very careful in your Diſſection, you will alſo borrow from *Quadratus Lumborum*, as you raiſe him from the *Ileon*, to which it firmly joyns it ſelf, as alſo near the *Scapula*; if care be not uſed, you will find ſome part of it come up with him.

The Ancients fond of their own Opinion, have aſſigned the motion of the *Os Humeri*, as being Orbicular, to be celebrated in a round Socket of the *Scapula*, by way of circumrotation, which cannot be accompliſhed, by reaſon the *Os Humeri* is ſtrongly faſtned by a Ligament to the inſide of the *Scapular Bone*, to prevent Luxation: Secondly, the Fabrick, Riſe, and Inſertions of the *Muſcles* of the *Arm*, are not appoſite for the circumrotation of its Bone, but for the production only of oppoſite Motions in ſeveral Segments of a Circle, alternately performed, directly upwards by the *Deltoides*, directly forwards by the *Pectoral Muſcle*, and backward by the *Infraſpinatus*, and ſomewhat backwards and downwards by the *Teres*, whilſt it is brought outwards by the *Latiſſimus Dorſi*; ſo that all theſe Muſcles, in their alternate and oppoſite motions, do move the *Os Humeri* as it were Circularly in different interrupted moments, and not by

TAB.XVI.


This extends the Neck
This dilates the Trunk
This extends the Trunk
Serratus poſticus Superior
Complexus
This extends the Neck
Serratus Superior ex^{tr} Situm
This dilates the Trunk
This brings the Scapula backwards
Rhomboides ex^{tr} Situm
Sacrolumbus
Longiſſimus Dorsi
Serratus poſticus inferior
This dilat the lower p^{t} of the Trunk
Idem ex^{tr} Situm
Dilates the lower part.
Sacro-lumbus ex^{tr} Situm
This extends the Neck

by way of Circumrotation in one entire Orbicular motion. The *Pectoralis*, *Supraſpinatus*, *Infraſpinatus*, *Teres Minor*, & *Subſcapularis* are inſerted in the *Os Humeri*, either into it's Head or Neck: And the *Teres Major*, and *Latiſſimus Dorſi* a little below its Neck; and the *Deltoides* about the upper part, and the *Coracobrachialis* about the inward part of the middle of the *Os Humeri*, as the moſt advantageous for the raiſing up of the *Arm*; but the other Muſcles are implanted into the Head or Neck in a ſemicircular manner, to confine the *Os Humeri* in, by Ligament to its Socket, as to its proper Sphere of motion: But theſe Muſcles being Inſerted in the *Os Humeri*, near the *Scapula*, as the Prop of their Motion, cannot manage the motion of the *Arm*, with ſo much advantage to the lifting up the weight of the *Arm*, as if they were Inſerted at a greater diſtant from the *Scapula*, their *Fulciment*; whereupon *Nature* hath moſt Wiſely contrived the Inſertions of *Coracobrachialis*, and the *Deltoides*, as the Elevators of the *Arm*, about the middle of it, as more beneficial for the readier Elevation of the Weight of the *Arm* and the Cubite articulated with it; but the more frail Motions of the *Arm*, laterally and downwards are more readily performed by Muſcles inſerted in the *Head* and *Neck* of the *Os Humeri*, near the *Scapula*, their Fulciment; and if the *Muſcles* of the *Arm* had been implanted in the *Os Humeri*, near its Articulation with the *Radius*, it would have elevated the *Arm* with greater eaſe, if it would not have ſwelled the *Bulk* of the *Arm*, to a deformed Greatneſs in the Contraction of the Muſcles.

This you have at Tab. XV. & *at* Tab. XIX. *laid bare.*

Serratus Poſticus Superior, or the upper backward Saw-like *Muſcle*.

This Dilates the *Trunk*.

THIS hath its Name of *Serratus*, from its ſaw-like Indentions, and *Poſticus*, it being an *Antagoniſt* to thoſe planted in the Fore-parts, as alſo *Superior* and *Inferior* from their Scituations: This is a ſmall *Muſcle* immediately lodged under the *Rhomboides*, as I have already ſaid, it ariſeth wirh a thin *Tendon* between each *Scapula*, and is inſerted over the firſt Pair of the Muſcles of the *Head*, ariſing membranous from the *Spines* of the three lower *Vertebres* of the *Neck*, and the firſt of the *Thorax*, and marching under the *Scapula*, is inſerted into the inner ſpaces of three or four of the upper Ribs; by the Elevation of which, it dilates the *Thorax*.

Hiſtory. *Felix Plater. de ſuis Obſ.* writes of a Butcher, who for a long time complaining of an intollerable *Pain* in his *Back*, had an *Abſceſs* aroſe in the midſt of it, which being laid open, a large quantity of Water was thence diſcharged: And altho' this plentiful Evacuation thus dayly coming from him, ſo emaciated him, that it brought him into a Conſumption; yet a ſtop being given to its Running, and a piece of a *Vertebre* of the *Trunk*, which was eroded by this corroſive Liquor being Extracted, the Man beyond all *Expectation* amended and recovered.

This you have at Tab. XVI. *both in and out of its place.*

Serratus Poſticus Inferior, or the lower backward ſaw-like *Muſcle.*

This Dilates the Lower-part of the *Trunk*.

THIS has its Name as the other, and is called *Inferior* from its ſituation; it is a Muſcle broad, thin and membranous, planted almoſt in the middle of the *Back*, under the *Latiſſimus Dorſi*, it ariſing from the *Spines* of the lower *Vertebres* of the *Back*, and the firſt of the *Loins*, and marching tranſverſly, becomes fleſhy, and is inſerted into three or four of the baſtard Ribs, by ſo many diſtinct *Terminations*, and by drawing them outwards, does at the ſame time dilate the lower part of the *Trunk*.

Hiſtory. *Peter Pigray* writes of a *Soldier* wounded in the *Trunk*, by a *Musket Bullet*, who 3 or 4 Months after he was cured, vomitted up a Fragment of a Rib, the length of 3 Fingers by his Gulet, and yet recovered; nor was he troubled with any ill *Symptoms* while he was under cure.

This you have at Tab. XVI. *both in and out of its place.*

Splenius, or *Triangularis.*

This briugs the *Head* Backwards.

THIS takes its Name partly from the Figure it hath with a *Spleen*, and *Triangularis*, as ſome ſay, from its Make, it ariſing partly nervous, and partly fleſhy from the *Spines* of the 5th. 4th. 3d. 2d. and firſt *Vertebres* of the *Thorax*, and from the

Spines of the lower *Vertebres* of the *Neck*, and then running broad and long about the third *Vertebre* of the *Neck*, both its Originations do there unite, and with its oblique Fibres, both of them do inſert themſelves into the middle of the *Occiput*; You muſt take it off from its Origination, and preſerve as many of its *Anſulæ* as you can between the *Spines*, by running your Knife between them, and recovering its *Tendon*. Annotat.

If both move, they bring the *Head* directly backwards, if one only move, it turns the *Head* ſideways. Its Uſe

Of the Uſe of the Muſcles of the Head *and* Neck.

The *Muſcles* of the *Head* and *Neck* do ſport themſelves in oppoſite Motions backwards, forwards and laterally: The *Muſculi Renuentes & Annuentes* being *Antagoniſts*, do make quick and appoſite turns of the *Head* and *Neck*; backwards by the *Recti Majores & Minores*, aſſiſted by the *Obliqui Superiores & Inferiores*, ariſing from the firſt and ſecond *Vertebres* of the *Neck*, and are inſerted into the middle, or ſides, or top of the *Os Occipitis*.

And the *Head* is moved forwards by the longer or ſhorter Contractions of the *Maſtoidei*, and longer *Muſcles* of the *Neck*, the former ariſing from the top of the *Sternon*, and are inſerted into the *Proceſſus Mammiformis*, and the latter ariſing out of the Forepart of all the *Vertebres* of the *Thorax*, and do terminate into the Forepart of all the *Vertebres* of the *Neck*: But the *Tenſors* and *Flexors* of the *Head* and *Neck*, do by their *Tonick Motion* ballance each other, and keep the *Head* in an erect Poſture; and the *Muſculi Recti, & Obliqui*, being ſhort, and ſmall Muſcles, cannot by any ſingle Contraction move the *Head* laterally, which by its weight is carryed forwards and downwards, (as being top heavy) was it not ſupported by the conſtant and gentle Contractions of many *Tenſors*, which being more vigorouſly performed by the *Recti & Obliqui*, do pull the *Head* a little backwards, in Nodding, as *Renuentes*, and is brought further backwards to acute Angles by the *Complexi*, coming from the *Tranſverſe Proceſſes* of the *Neck*, and are laterally inſerted to the upper part of the *Occiput*; and the *Head* is alſo brought backward by the *Splenii*, (Aſſiſtants to the *Complexi*) ariſing out of the *Spines* of the four upper *Thoracic Vertebres*, and theſe being Partners of greater Dimenſion, do move the *Head* further backwards, than the *Recti* and the *Obliqui*; and each of them acting ſingly, as being ſtronger and longer than the former Muſcles, do draw the *Head* to one ſide backwards; and on the other Hand, the *Head* is pulled more and more forwards by the *Maſtoidei & Longi*; and when both the *Tenſors* and *Flexors* do act ſeparately, they bring the *Head* backward, and forward laterally, alternately, and each combatant, when highly invigorated as Conquerors, relaxeth his unactive vanquiſhed *Antagoniſt*.

This you have at Tab. XVII.

Complexus, or *Trigeminus*.

This extends the *Neck*.

THIS hath a threefold Origination, firſt from the fourth and fifth *Proceſſes* of the *Vertebres* of the *Thorax*, then becoming fleſhy, doth aſcend over the reſt of theſe *Vertebres*, until he reacheth the lower *Vertebre* of the *Neck*, where it becomes a round *Tendon*; not far from thence again, it appears fleſhy, and doth inſert its ſelf into the upper part of the *Occiput* laterally: Its ſecond Origination is with a ſhort *Tendon* from the ſame *Proceſs* of the laſt *Vertebre* of the *Neck*, then becoming fleſhy, is joyned to the other before its Inſertion: Its third Origine is partly fleſhy, and partly nervous, from the *Tranſverſe Proceſſes* of the firſt and ſecond *Vertebres* of the *Trunk*, and running obliquely outwards, after having united with the former, is inſerted into the Root of the *Mammillary Proceſs*, beſtowing an *Anſula* on every *Proceſs*.

Annotat. To find this fairly, divide the *Spinatus*, and *Longiſſimus Dorſi*, and its Origination will plainly appear.

Uſe. *Riolan* obſerves, that the Fibres both of this Muſcle, and *Splenius* being variouſly interwoven, do decuſſate each other in acute *Angles*, and do add Strength to either of them in their Contractions.

This you have at Tab. XVI. *in its place, and laid bare, and alſo at* Tab. XVII.

TAB. XVII.

Fig: 1.

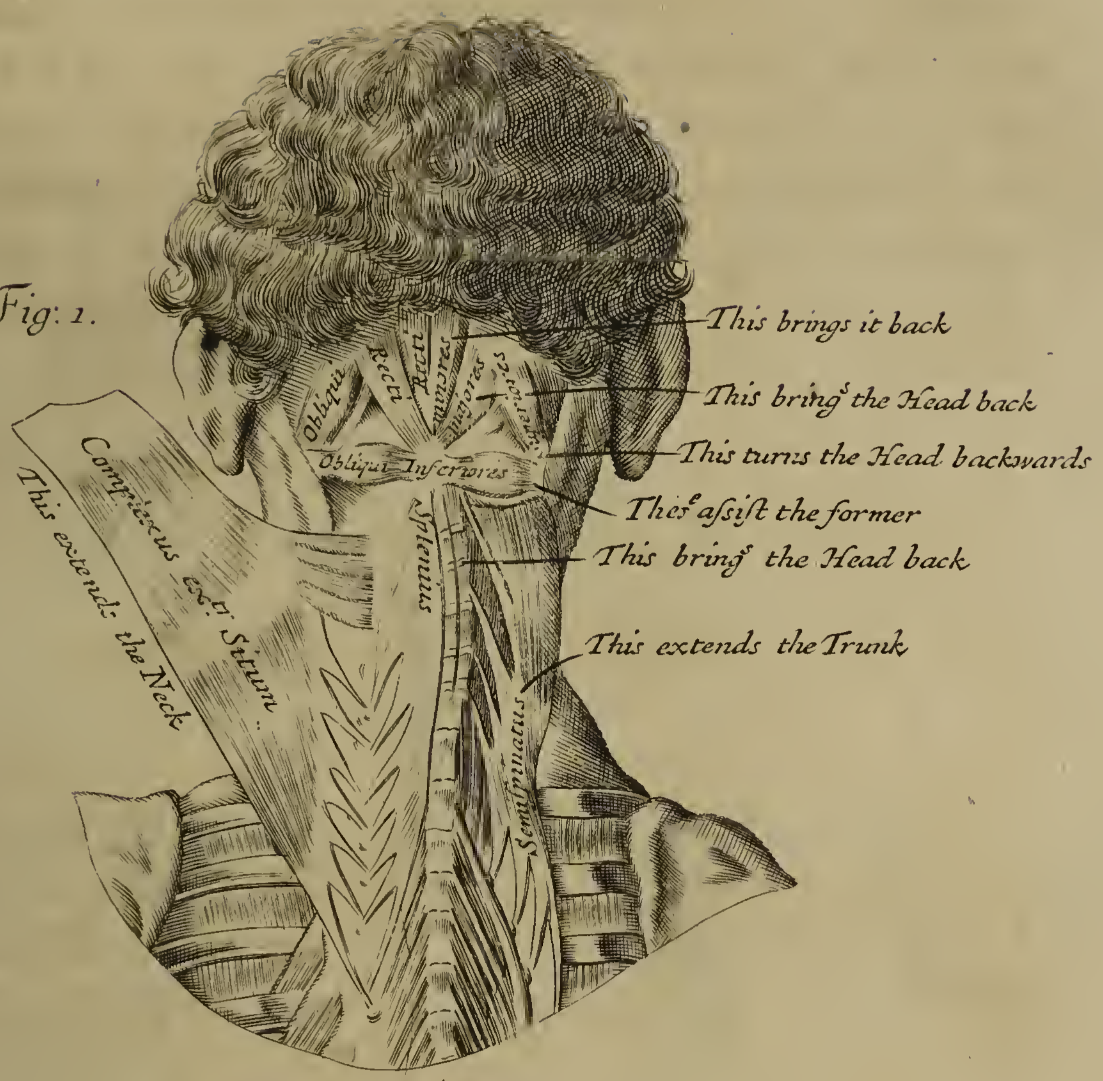
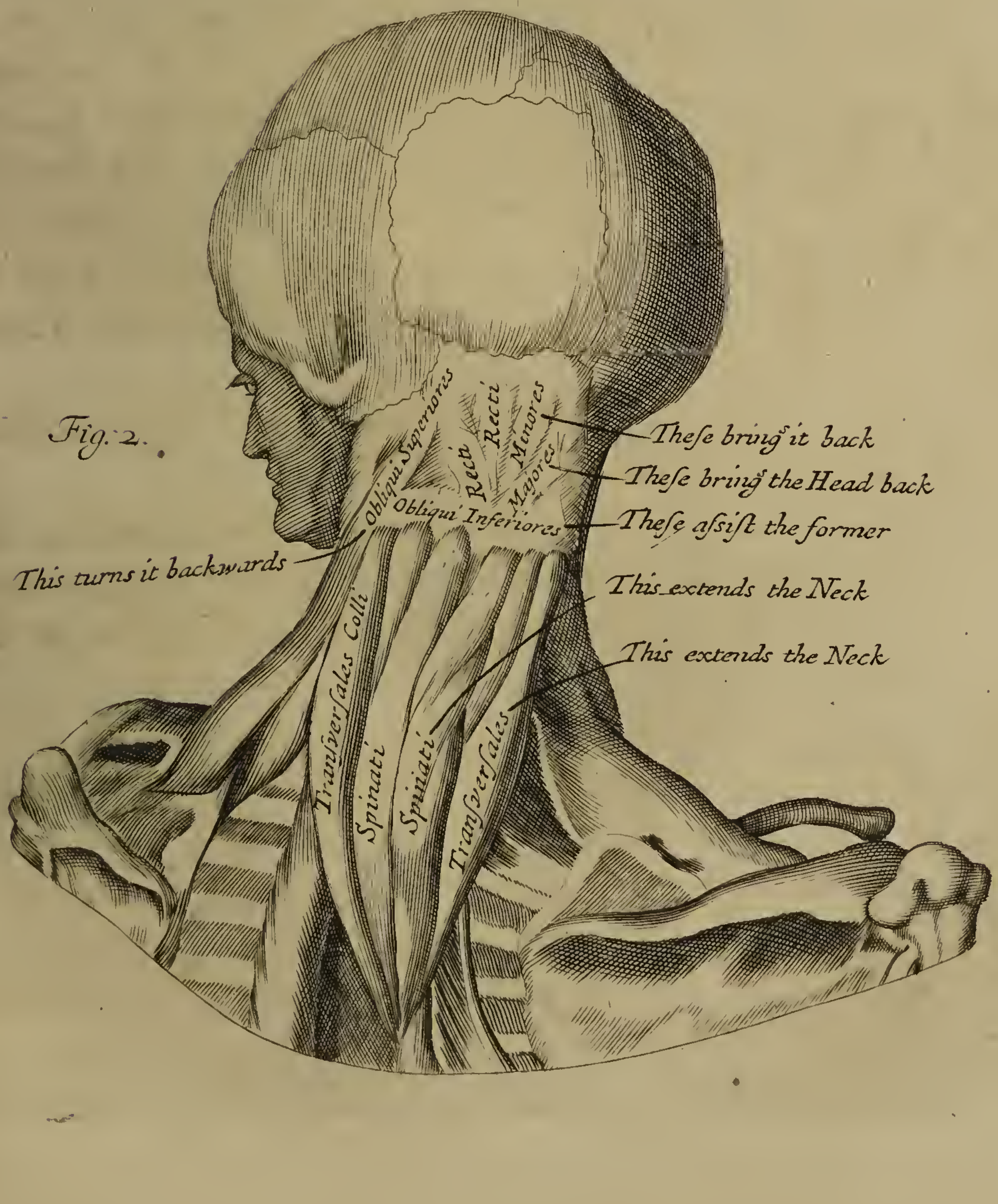


Fig: 2.



Recti Majores.

THESE being ſmall, thin, fleſhy and ſhort, do ariſe out of the *Spine* of the ſecond *Vertebre*, and growing broader, and more fleſhy in their Aſcent, are inſerted into the middle and back part of the *Occiput*, helping forwards the Motion of the third Pair.

Theſe bring the *Head* back.

Theſe you have at Tab. XVII. Fig. I, II.

Recti Minores.

THESE Pair lodging under the former, are likewiſe two ſmall *Muſcles*, being much of the ſame Subſtance and Shape, accompanied with the like *Ductus*, they ariſing fleſhy from a ſmall *Protuberance* of the firſt *Vertebres* of the *Neck*, and aſcending, are implanted like the former, juſt under them, aſſiſting them in their Motions, by drawing the *Occiput* towards the *Neck*.

Theſe do aſſiſt the former.

If they both operate, they bring the Head directly backwards, if one only acts, it brings it laterally.

Uſe.

This you have at Tab. XVI. Fig. I, II.

Obliqui Superiores.

THE firſt Uſe of the *Dentiform Proceſs*, is to be a Centre of Motion, on which the firſt *Vertebre* being pliant, does freely play backwards and forwards, as Dr. *Collins* writes; whence he propoſeth, that the firſt may be called *Epiſtrophis*, tho' diverſe *Anatomiſts* have aſſigned this to the ſecond *Vertebre*, which may more properly be termed an *Axis*, in reference to its *Proceſs*; about which, it being immoveable, the firſt *Vertebre* doth variouſly ſport its ſelf in oblique Motions, performed by theſe, and the other lower oblique *Muſcles*: Theſe are planted under the *Recti*, anſwering both their Form, Subſtance and Shape, being ſmall, ariſing fleſhy from the hinder part of the *Tranſverſe Proceſs* of the upper *Vertebre* of the *Neck*,

Theſe turn the *Head* backwards.

and being carryed along in an oblique Courſe, are inſerted into the ſides of the *Occiput*, near the outward ſide of the *Recti*.

Bauhine will have them to ariſe in the *Occiput*, and that they do end in the *Apices* of the lateral *Proceſſes* of the firſt *Vertebres* of the *Neck*, and the *Heads* of theſe *Muſcles* being affix'd to the ſecond *Vertebre* as being immoveable: The *Right Oblique Superiour* and *Inferiour* Muſcles being planted in an oblique Situation, and ending in the right ſide of the *Occiput*, when contracted, muſt neceſſarily bring the Face towards the *Right Shoulder*, and in a contrary manner, the *Left* being implanted as their *Antagoniſts*, ending in the ſame manner on that ſide, muſt alſo bring it to the *Left Shoulder*.

This you have at Tab. XVII. Fig. I, II.

Obliqui Inferioris.

Theſe aſſiſt the former.

THESE are ſeen to ariſe fleſhy, thin, and long from the *Spinal Proceſs* of the ſecond *Vertebre* of the *Neck*, near the beginning of the *Recti*, and growing more fleſhy, and obliquely aſcending, are inſerted with the *Obliqui Superiores* into the *Tranſverſe Proceſs* of the firſt *Vertebre* of the *Neck*, where the former Muſcles had their Originations.

This you have at Tab. XVI. Fig. I, II.

Tranſverſalis Colli.

This extends the *Neck*.

THIS hath its Name, it ariſing from the *Tranſverſe Proceſſes* of the *Neck*; that is, it ariſeth fleſhy from their roots, and growing more fleſhy, are thereunto annext at their outſide; this being allowed to bring the *Neck* obliquely backwards, one only acting; between theſe are carryed the *Nerves* of the *Spinal* Marrow, which do ariſe out of the *Vertebres* of the *Neck*.

This you have at Tab. XVII. Fig. II.

Spi-

Spinalis Colli.

THIS hath its Name from its place, it bordring upon the *Spines* of the *Neck*, and ariſeth from the Seven *Spines* of the *Vertebres* of the *Thorax*, and the five *Spines* of the *Vertebres* of the *Neck*, bringing them together, and not diſtinguiſhable but by the ſaid *Spines*; and becoming fleſhy in its deſcent, is implanted into the Lower Part of the Second *Vertebre* of the *Neck*, and is ſaid to bring the *Neck* directly Backwards.

This extends as the former.

This is ſhewn at Tab. XVII. Fig. II.

Sacrolumbalis.

THIS ariſing from the back part of the *Spine* of the *Os Ileon*, and Upper of the *Sacrum*, and the *Spines* of the *Lumbal Vertebres*, has this Name from hence given it; and it lodging under *Serratus Poſticus Inferior*, and having the ſame Origination with *Latiſſimus Dorſi*, and adjoyning to him ſide-ways, outwardly all its length even until it has arrived at the 12th. *Vertebre* of the *Thorax*, where they ſeem to be two, altho' ſcarce diviſeable by the Knife, and then growing thinner, doth inſert its ſelf by two ſmall *Tendons* into every Rib of the *Thorax*, at their Incurvations. There is a great diſpute among *Anatomiſts* about theſe *Tendons*, ſome alledging, that this *Muſcle* doth ſend forth a double *Tendon*, one upwards to the lower parts of the *Ribs*, and the other downwards to the upper parts thereof, and theſe are ſaid to raiſe the *Ribs* upwards in Inſpiration, and to bring them down in Expiration, which contrary Motions were never allowed to any one *Muſcle*: And it may well enough be ſuppoſed, that theſe *Tendons* thus deſcending, do ariſe from ſome other peculiar *Muſcle*; which upon a diligent Enquiry, *Diemerbroeck* tells us, he found to come from the Muſcle juſt laying under this; and to which it is ſo cloſely affixed, that it is ſcarce thence diviſeable; which *Muſcle* he calls *Cervicalis Deſcendens*, whoſe Tendons being variouſly planted contrary to thoſe of this *Muſcle*, do operate as variouſly in their Contractions; for that we ſee, as the Tendons of the *Cervicalis Deſcendens* do draw the *Ribs* upwards in Inſpiration;

This aſſiſts the former in its *Extenſion*.

ſo the *Tendons* of *Sacrolumbalis* do draw the *Ribs* downwards in Exſpiration, for their more eaſy and better Contraction.

This you have at Tab. XVI. *in and out of its place.*

Sacer.

This extends the *Loins.*

THE *Vertebres* belonging to the *Loins* are much larger and thicker, than thoſe of the *Neck* and *Back*, where we may ſee them drill'd with many ſmall Holes to let in the *Arteries* and *Veins* thro' them, by which our *Vital Liquor* is ſent into their ſpongy parts; and as the *Os Sacrum* is an admirable ſtrong Structure ſo made, both for Strength and Thickneſs; ſo is it made as a proper Baſis to ſupport this long Train of *Vertebres*, which have their Dependance from it, and which do border upon it; and over which are planted many *Muſcles* of great Uſe to the Body, among which, this is one, which hath this Name given it, becauſe it ariſeth ſharp and fleſhy from the upper part of the *Os Sacrum*, and from all the *Tranſverſe Proceſſes* of the *Loins*, and is joyned to their upper *Spines*, and is allowed three tendinous Inſertions; the firſt in the upper part of the *Tranſverſe Proceſſes* of the *Vertebres* of the *Loins*, the ſecond in the Root of the ſame *Proceſſes*, and the third in the *Spines* of the *Vertebres.*

To find this out, you muſt raiſe *Latiſſimus Dorſi & Sacrolumbalis*, from their membranous Originations at the *Os Ileon*, *Os Sacrum*, and from the *Lumbal Spines*, and imediately under theſe, this will appear in *Situ*, it being allowed to aſſiſt *Latiſſimus Dorſi* in its Operations.

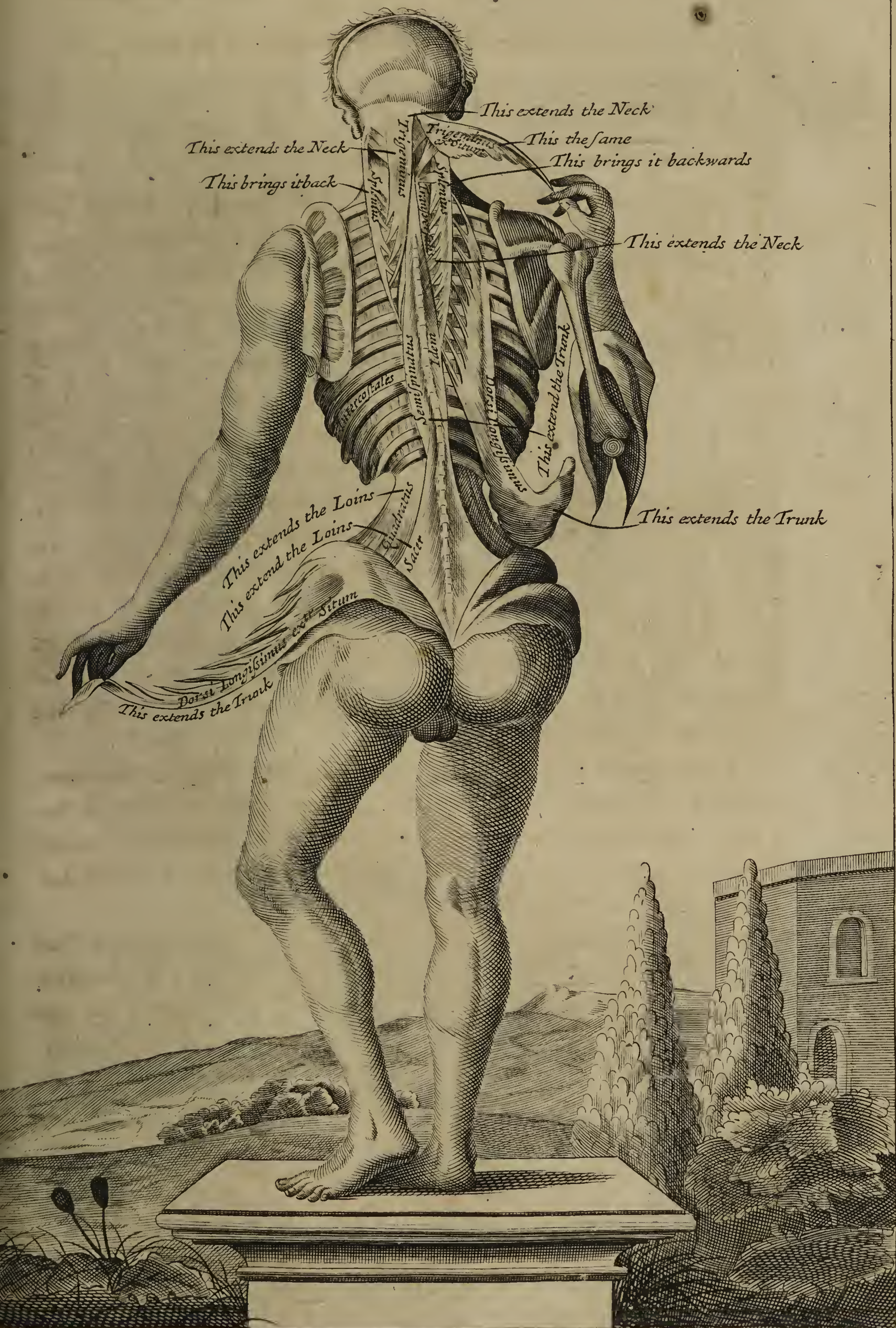
Hiſtory.

Foreſtus writes of a Phyſician, who had a crookt back *Girl* for his Patient in *Burgundy*, whoſe Back itching, made him ſuppoſe there might an *Abſceſs* ariſe there; hereupon he applying a Mucilage Playſter to it, brought it to Suppuration, which being layd open by a Chirurgeon, in the bottom of it were ſeen no ſmall quantity of Lice, which he waſhing away with a Decoction made of *Centaury* and *Lupines*, and cleanſing the Ulcer therewith; and afterwards applying proper *Sarcoticks*, he fill'd it up with Fleſh, and with *Epuloticks* skinn'd it.

This you have at Tab. XVIII.

TAB: XVIII

Finis Prælectionis quartæ



Semiſpinatus.

This extends the Trunk.

THIS ariſeth with a tendinous Origination according to *Diemerbroeck*, tho' by ſome its Origination is ſaid to be fleſhy, from all the *Spines* of the *Os Sacrum*, and the *Loins*, and becoming fleſhy, beſtows a nervous *Tendon* upon every *Spine* of the upper *Vertebres*, and marching obliquely upwards, is inſerted into the upper *Spines* of the firſt *Vertebres* of the *Thorax* extending it.

Its Uſe.

Theſe with the former acting together, are ſaid to bring the whole Spine obliquely backward, or to either ſide, they are alſo allowed to aſſiſt in raiſing the *Trunk* of the Body.

Hiſtory.

Riverius in Obſ. 196. tells us of one who had five Impoſtumations in his Back, near the *Back Bone*, bred from a cold matter, collected by degrees, without Pain, or Inflamation, or Change of Colour; and tho' the Tumours were ſoft, like that of an *Oedema*, and as big as a mans Fiſt, yet when opened, a *Laudable Pus* was thence diſcharged: The firſt three ſunk in three or four Months, the fourth was cured by large Inciſions made into the Back, laying open all the *Sinus's*, &c. and the fifth cured by opening it with a *Potential Cautery*, and the Ulcer afterwards cleanſed with proper Injections, *&c.*

This you have at Tab. XVIII.

Longiſſimus Dorſi.

This extends the Trunk.

THIS hath its Name from its length, it being one of the longeſt *Muſcles* belonging to the Body; and a Muſcle not only of great Uſe, and Service to the *Trunk*, in allowing it a direct Motion, but alſo of no ſmall Aſſiſtance in *Progreſſive Motion*: And therefore I have more properly placed this next to *Semiſpinatus*, and juſt before *Quadratus Lumborum*: This ariſeth from all the *Spines* of the *Os Sacrum*, and all the *Lumbal Vertebres*, as alſo from the inner part of the *Os Ileon*, where it adjoyns its ſelf to the *Sacrum*, its outward beginning being very ſtrong, nervous, and ſomewhat acute, but inwardly fleſhy; it adjoyning its ſelf in its Aſcent to the *Tranſverſe Proceſſes* of the *Loins*, and then becoming more fleſhy in its march, is ſeen to narrow its ſelf, it beſtowing a ſmall nervous *Tendon* on every *Tranſverſe Proceſs* of the *Thorax*, except the twelfth Rib, and doth inſert its Self into the firſt *Vertebre* of the *Thorax*, altho' ſometimes it hath been ſeen to reach even the *Mammillary Proceſs.*

Obſervat. Upon this, the whole *Sacrolumbalis* is ſaid to reſt its ſelf, it obtaining the ſame Origination with it, and is continued ſo from the end of the *Os Sacrum*, to the twelfth *Vertebre* of the *Thorax*, and in its whole Progreſs to the *Loins.*

This you have at Tab. XV. *and at* Tab. XVII.

Quadratus Lumborum.

This extends the *Loins.*

IT takes its Name from its Figure, it having ſomewhat of a Square, or Quadrangular Figure, it ariſeth ſhort, thick, and fleſhy from the back part of the *Spine* of the *Os Ileon*, as alſo from the upper part of the *Os Sacrum*, and is inwardly inſerted to all the *Tranſverſe Proceſſes* of the *Loins*, juſt beneath the *Pſoas.*

This you have at Tab. XVII. *and at* Tab. XXVIII.

Lect.

Lecture V.

To which theſe following *MUSCLES* do belong, *viz.*

- *Deltoides,*
- *Pectoralis,*
- *Biceps,*
- *Supraſpinalis,*
- *Infraſpinalis,*
- *Teres Major,*
- *Teres Minor,*
- *Nonus Humeri Placentini,*
- *Subſcapularis,*
- *Brachialis Externus,*
- *Brachialis Internus,*
- *Anconæus,*
- *Gemellus,*
- *Palmaris,*
- *Caro Muſculoſa Quadrata,*
- *Flexor Carpi Exterior,*
- *Flexor Carpi Interior,*
- *Extenſor Carpi Exterior,*
- *Extenſor Carpi Interior,*
- *Perforatus,*
- *Perforans,*
- *Extenſor digitorum Communis,*
- *Indicis Extenſor,*
- *Lumbricales,*
- *Flexor primi Internodii Pollicis,*
- *Flexor tertii Internodii Pollicis,*
- *Pollicis Adductor,*
- *Pollicis Abductor,*
- *Extenſor primi Internodii Pollicis,*
- *Extenſor ſecundi & tertii Internodii Pollicis,*
- *Interoſſei Manus,*
- *Auricularis,*
- *Minimi Digiti Abductor,*
- *Pronator Quadratus,*
- *Pronator Radii Teres,*
- *Pronator Radii Longus,*
- *Supinator Radii Brevis.*

Deltoides.

THE *Bone* inarticulated above with the *Scapula*, and beneath with the *Cubite*, is by *Celſus* called *Os Humeri*, or commonly the *Arm Bone*; among the Muſcles allowed it, we begin with this, which takes its Name from its Figure it has with a Greek Δ, and therefore by ſome it is called *Deltoides*, or *Triangularis*, and by others *Humeralis*; it ariſing with a broad and nervous Beginning from the middle part of the *Clavicle*, the *Arm*, and the whole *Spine* of the *Scapula*, and is expanded outwardly with a ſtrong fleſhy Covering, and inwardly with a nervous Membrane almoſt reaching the middle of the *Arm*, and is allowed to bring the ſame either upwards, forwards, or backwards, according to the various working of its Fibres.

This lifts up the *Arm*.

Annotat. Many unskilful Men do uſually make *Fontanels*, or Iſſues, in the midſt of this Muſcle, tho' very diſagreeable both to Senſe and Art; ſince upon every Contraction of the Arm, the Orifice being therewith contracted, is ſeen to turn the *Pea* out of its Place.

Hiſtory. We read of an *Infant* born without *Arms*, having all the other parts of his Body rightly made, whoſe *Feet*, when he arriv'd at the Age of twenty years, acted the part of other mens Hands, in taking, cutting, and ſerving himſelf with his Toes, as others do with their Fingers, and ſeveral other Exerciſes he perfoimed with his *Toes*, beſides feeding himſelf.

And at the writing hereof, we have a man lodging over againſt me, whoſe Name is *John Sayer*, and born at the Iſle of *Sarden*, in the Coaſt of *Italy*, who now is about twenty four years of age, who has arrived at that dexterity of his *Toes*, That he can play at Cards and Dice, comb his Hair, threads a Needle, and ſows with his *Toes*, writes with them, draws out a Sword, and puts it into the Scabbard, ſhaves himſelf, fans himſelf, feeds himſelf, and fills his Liquor, and drinks it, cuts his Meat with a Knife, and feeds himſelf with a Fork, charges and diſcharges a Piſtol, ſounds a Trumpet with two Fingers added to one Shoulder, and beats a Drum with his *Toes* at once, and ſome other Tricks he performs very dexterouſly with the help of his *Toes* only.

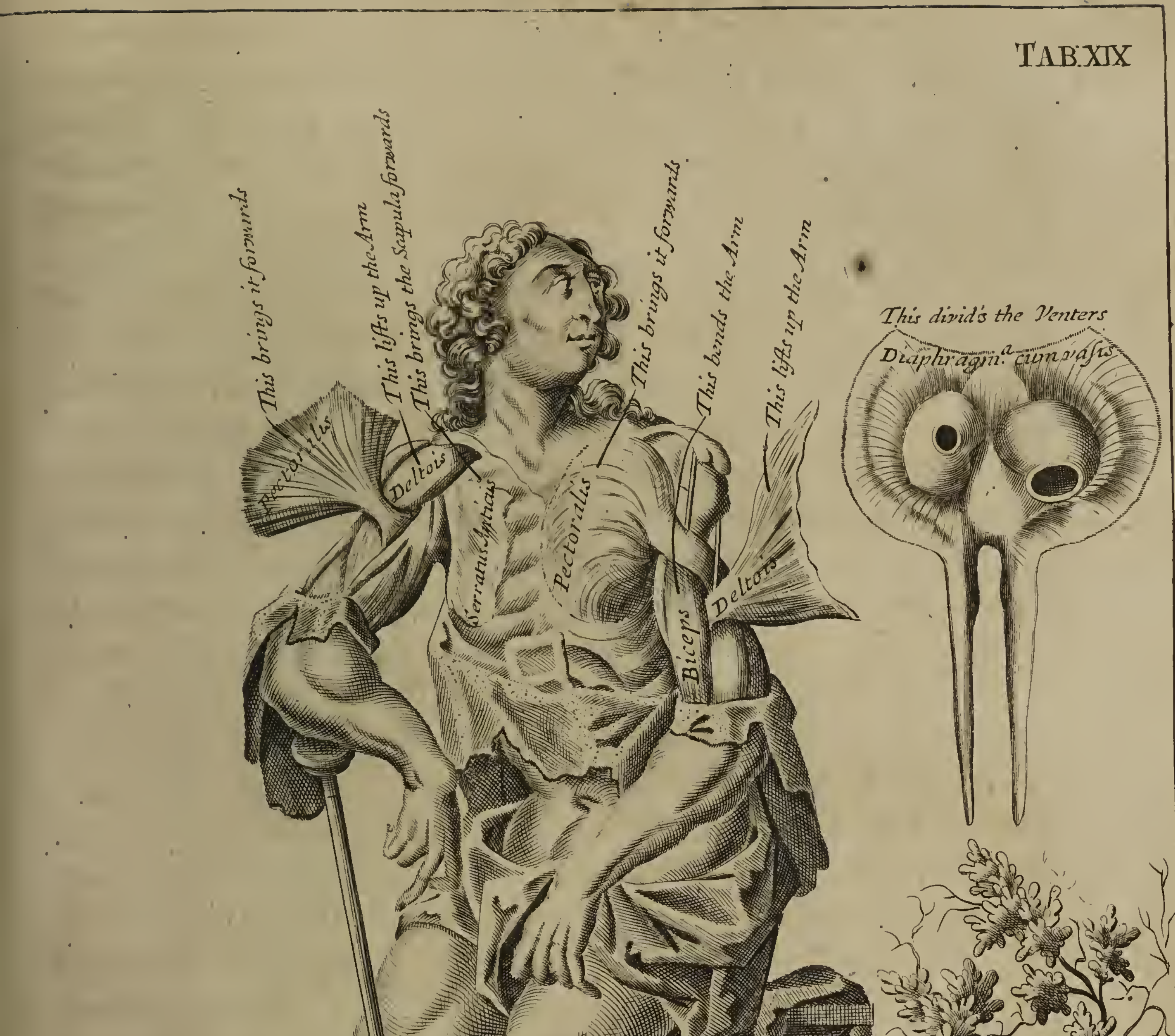
This you have at Tab. XIX. *both in and out of its place.*

Pectoralis.

This brings the *Arm* forwards.

THIS hath its Name from its Situation, having a ſemicircular fleſhy Origination on the Fore-part of the *Breaſt*; then ariſing with a Membranous beginning from the middle Cavity of the whole *Sternon*, as alſo from the *Cartilages* of the *6th. 7th.* and *8th. Ribs*, (fram'd as it were out of many *Muſcles*) and narrowing its ſelf towards its end, is implanted by a ſhort and ſtrong Tendon to the upper part of the *Os Humeri*, a little beneath its Head; this bringing the *Arm* to the *Breaſt*, or *Forwards*, ſometimes *directly*, or *obliquely Downwards*, according to the various Actings and Movings of its Fibres; by ſome this is called the *Boxing Muſcle*, or *Adducens Humerum*.

TAB.XIX


This brings it forwards
Pectoralis
This lifts up the Arm
This brings the Scapula forwards
Deltois
Serratus Anticus
This brings it forwards
Pectoralis
This bends the Arm
Biceps
This lifts up the Arm
Deltois
This divid's the Venters
Diaphragm.ª cum vaſis

There are generally two unfortunate Accidents which happen to the *Arm*, from bold Pretenders, and ignorant Practiſers, they both ariſe from the ill Exerciſe and Uſe of the *Lancet*; and ſince wee Live in an Age, where almoſt every bold *Emperick*, *Horſe-leech*, *common Barber*, and *Apothecaries Boy*, are commonly ſeen to let Blood, not knowing a *Vein* from an *Artery*, or a *Tendon* from a *Cartilage*: How ought every one to take that eſpecial Care of himſelf, as to make uſe of the beſt in their Profeſſion, where he may be ſafe and free from thoſe unlucky Hazards, and moſt certain Dangers, theſe Impudent Quacks are dayly ſeen to run thoſe into, who are ſo unfortunate as to come under their Treatment? I ſhall only mention the pricking of an *Artery* here; and a *Tendon* in the next, it being its moſt proper Place.

Hiſtories

Fabrit. Hildan. tells us, *Obſ. Chir. Cent.* 6. That in the Year 1612, of a Noble-Man who was Wounded in the Night time with a Pocket Piſtol, whoſe Bullet grazing on his *Pectoral Muſcle*, made its way into his left *Arm*, not much diſtant from the *Deltois*; in which, after having been lodged near Seven Weeks, (an Abſceſs ariſing on the Part) the Bullet made its way thro' it, and beyond all expectation, the Gentleman received a perfect Cure thereof.

Fabrit. Hildan Obſ. 44, *Cent.* 3. tells us of one in the Year 1604. troubled with the *Itch* ariſing from a Melancholick humour, who went to a *Barber* to be blooded in the *Arm*, who upon pricking the *Baſilick Vein*, entred the *Artery* with it, whence preſently an *Aneuriſm* aroſe; to whom, when Medicines had been applyed in vain above a Month; other Chirurgeons were conſulted in his Caſe, who judged him deſperate, and much queſtioned the Cure; He coming to ſee the Patient, and obſerving where the Inciſion was made, and that a Tumour there ariſing as big as a Gooſe Egg, looking pale, and ſomewhat hard, in which he not only perceived a Pulſation by his Finger, but plainly by his Eye, and that the Patient could not Extend his *Arm*, altho' not accompanyed with much Pain, but when he tryed to Extend it; he ſeeing the Man not to be undertaken without much difficulty, refuſed to be concern'd with it; but being afterwards moved with pity, at the requeſt of his Friends, undertook it, and preſcribed the Method he there inſerts, by which the Tumour became repreſt, the Influx hindred, and the whole Arm Reſtored to its perfect Uſe again.

Admonit. *Galen de Anat., diſſect. lib.* 6. writes, That an *Artery* is made with a double Coat, and that as the outward is thin and ſoft, intertext of right and oblique Fibres, ſo the inner Coat is five times harder and thicker. In an *Aneuriſm* therefore, the inner Coat is rent, and the outward only dilated, or ſtretcht, as I have formerly ſhewn; juſt ſo was it in this Man, where, altho' he had both the Coats of his *Arteries* cut, yet the outward Coat, being thin, and planted outwards near the *Veins*, ſeemed readily to heal, while the inward, by reaſon of its vehement and continual Motion, and of its hardneſs alſo, could not ſo eaſily and readily agglutinate, and the Blood flowing by degrees thro' this into the other, cauſed this its Extenſion.

This is ſhewn at Tab. XIX. *in its proper Place, and at* Tab. I.

Biceps.

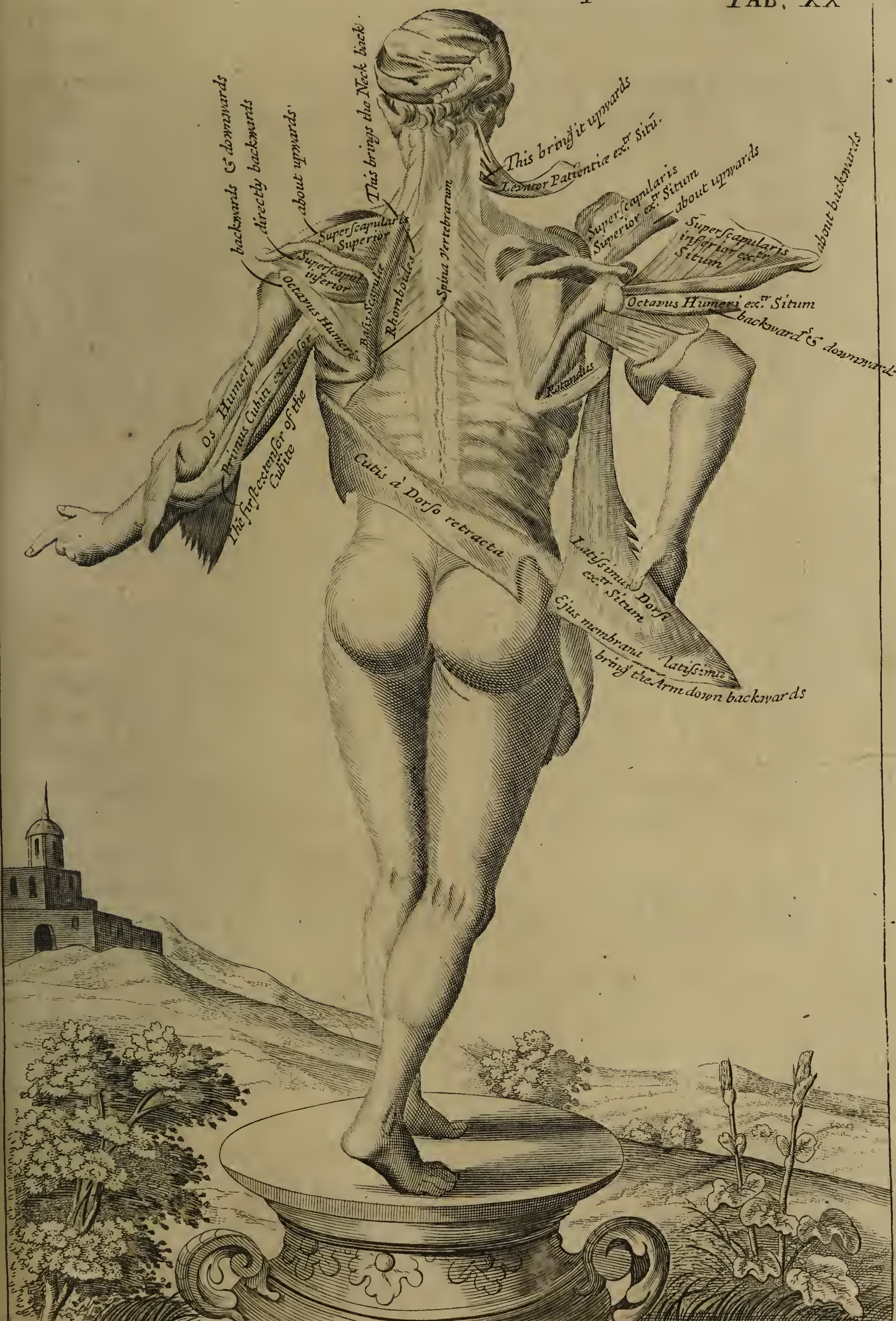
This bends the *Arm*. THIS hath its Name from its double Head, or Origin; it firſt ariſing from the top of the *Acetabulum Scapulæ* outwards, by one Subſtance, and then running under the Ligament of this juncture over the Head of the *Os Humeri*, and thro' a *Channel* inſculpt from him, it is there bound in by a proper Ligament; next it ariſeth broad, fleſhy and nervous, from the *Coracoidal Proceſs* of the *Scapula*, and is carried over to the inner head of the *Os Humeri*, and in his deſcent meets with the former, and do there make one ſtrong and fleſhy Muſcle; then narrowing himſelf, is converted into a ſtrong, thick, large, and nervous *Tendon*, and is inſerted by an oblong and round Tendon to a Protuberance at the upper Head of the *Radius*, where ſome have declared to have found it double.

Annotat. Its the Tendon of this Muſcle, which lodgeth under the middle Vein of the *Arm*, whoſe outward tendinous Fibres are to be kept free in *Venæſection*, which being once divided by ignorant *Blood letters*, does uſually produce convulſive Symptoms, which frequently happen upon theſe their bold and unskilful Inciſions.

This you have at Tab. XIX. *and at* Tab. XXI.

Supra-

TAB. XX


backwards & downwards
directly backwards
about upwards
This brings the Neck back
Superſcapularis Superior
Superſcapularis inferior
Octavus Humeri
Baſis Scapulæ
Rhomboides
Spina Vertebrarum
Os Humeri
Primus Cubiti extenſor
The firſt extenſor of the Cubite
This brings it upwards
Levator Patientiæ ex.tr Situ.
Superſcapularis Superior ex.tr Situm
about upwards
Superſcapularis inferior ex.tr Situm
about backwards
Octavus Humeri ex.tr Situm
backward & downward.
Rotundus
Cutis à Dorſo retracta
Latiſsimus Dorſi ex.tr Situm
Ejus membrana
latiſsimu
brings the Arm down backwards

Supraſpinalis, or *Supraſcapularis.*

This brings it about upwards.

THIS hath its Name from its Situation, it being planted above the *Spine* of the *Shoulder blade*, it ariſing long and fleſhy from the *Baſis* of the *Scapula* above its *Spine*, filling the whole Space between the *Spine*, and the upper part of the *Scapula*, and marching back towards its *Neck*, gets under the ſecond Ligament of the *Humerus*, as doth the *Biceps*, and is obliquely inſerted by a ſtrong round and broad *Tendon*, into the *Neck* of the *Os Humeri*, aſſiſting the former in bringing the *Arm* about, whilſt others as ſtrenuouſly declare, that it lifts up the *Arm* with the *Deltois*.

This you have at Tab. XX. *laid bare.*

Infraſpinatus, or *Infraſcapularis.*

This brings it about directly backwards.

THIS hath its Name from its Situation being planted below the *Spine*, that is, covering the whole outward part of the *Scapula*, which is under the *Spine*; it ariſing fleſhy from the lower *Baſis* of the *Scapula*, and taking the greater part of its Cavity with it, runs backwards, and narrowing its ſelf, according to the Form of the part, as it paſſeth over the Juncture in a ſemicircular Manner, and then becoming tendinous, is inſerted to the Head of the *Os Humeri*.

I humbly conceive, that this *Muſcle* according to its Situation, cannot but aſſiſt the *Deltois* & *Coracobrachialis*, in lifting the *Arm* upwards.

This you have at Tab. XX.

Teres Minor.

This brings the *Arm* upwards.

THIS hath its Name from its Figure and Make, and by *Fallopius* it is held to be the eighth *Muſcle* of the *Scapula*, and from its Situation he calls it *Tranſverſalis* & *Brevis*, & *Rotundus*, from its Origination and Shape; it ariſing ſharp and fleſhy from the lower Angle of the *Scapula* at its *Baſis*; and then growing more fleſhy towards its *Venter*, doth again leſſen its ſelf in its oblique deſcent, where becoming Tendinous, is inſerted into the *Neck* of the *Os Humeri*, helping forwards the motion of the 4*th. Muſcle*: Some *Anatomiſts* ſuppoſing it to be only a part thereof; this by *Spigelius* is called *Octavus Humeri Placentini.*

This you have at Tab. XX.

Teres Major, or *Rotundus Major.*

This brings the *Arm* backwards and downwards.

THIS ariſeth fleſhy from the lower Angle of the *Scapula*; and then growing round, doth obliquely aſcend with the former, ending with a ſhort, flat, and ſtrong Tendon, a little below the *Neck* of the *Os Humeri*, it bringing the Arm ſomewhat backwards and downwards.

This you have at Tab. XX.

Nonus Humeri Placentini.

This doth aſſiſt the former in its Motion.

THIS is ſo named by *Spigelius*, as being the 9*th. Muſcle* of the *Arm*; & by ſome it is called *Peforatus*, its *Venter* being Perforated, and thro' which paſſeth a *Nerve*; and *Coracoides*, and *Coracobrachialis*, it ariſing from the *Coracoidal proceſs* of the *Scapula*, it being partly Fleſhy, and partly Tendinous, at its ſaid Origination from the ſame *Proceſs*, and marching forwards in its deſcent, it grows larger, and inſerts it ſelf with a ſtrong Tendon, at the inner part of the *Os Humeri*, about its middle; bringing the *Pectoralis* with it forwards to the *Breaſt*, and being perforated in its *Venter*, a large *Nerve* is ſeen to paſs thro' it, which brancheth its ſelf into ſeveral *Muſcles* of the *Cubite*: *Riolan* ſuppoſeth this to be only a part of the *Biceps*.

This you have at Tab. XX. Fig. I, II.

Subſcapularis.

This brings the *Arm* outwards.

THIS takes its Name from its place, and Origination, it being a large fleſhy *Muſcle*, filling the inner hol-

TAB XXI.

Fig. 1.

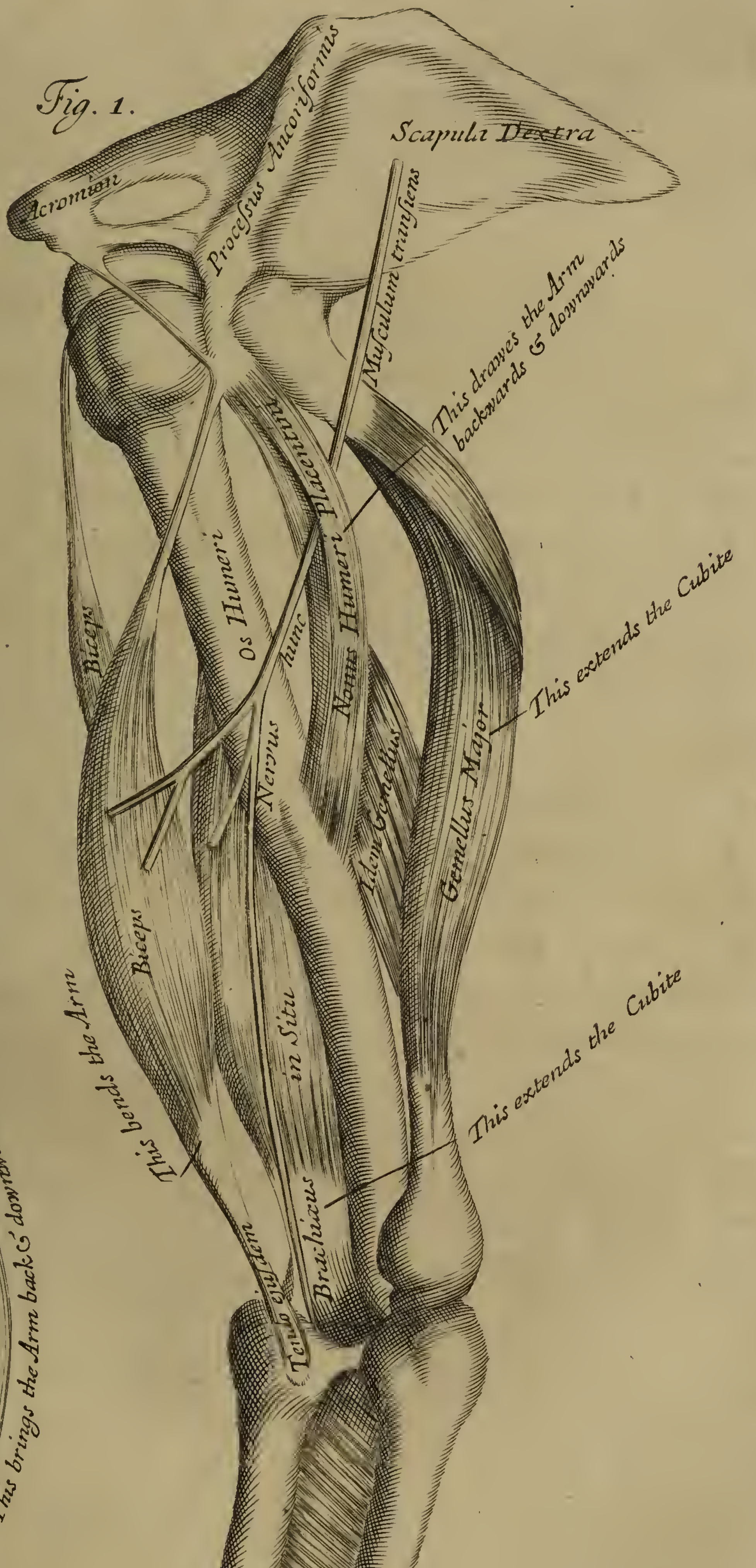
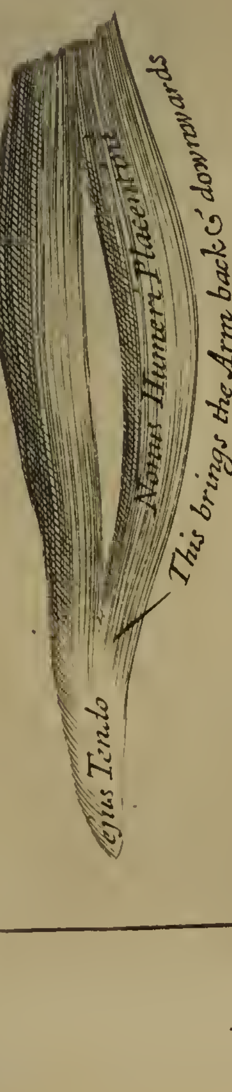


Fig. 11.



hollow part of the *Scapula*; and ariſing fleſhy from its *Baſis* inwards, and leſſning its ſelf in its march along the Bone, doth Inſert its ſelf in a Semicircular manner to the *Neck* of the *Os Humeri*.

Theſe *Muſcles* of the *Arm* working together, do bring it about; this by all *Anatomiſts* being ſuppoſed a *Depreſſor*.

This you have at Tab. XII.

Brachialis Externus, or *Gemellus Major*.

This extends the *Cubite*.

THE *Cubite* being framed of two oblong round Bones called *Radius & Ulna*, the firſt planted near the *Orbite* of the lower part of the *Shoulder-blade*, with which the *Ulna* is articulated; the *Ulna* being thick and ſolid in its upper part, having two viſible Proceſſes, in the middle of which, a large *Sinus* is exſculpt, for letting in the *Proceſs* of the *Scapula*, not far from the upper Joynt, where the *Neck* of the *Radius* is planted, it ſending forth another *Proceſs* near the inſide of the *Cubite*, where it frames a proper place for the Inſertions of the *Flexors* of the *Cubite*, and the *Radius*, being thicker and broader in its lower part, does there make a fit Articulation with the *Carpus*: This Muſcle hath alſo the Name of *Gemellus*, from its double Origination, it ariſing double, broad and ſtrong, firſt tendinous from the upper part of the lower *Coſta*, or Rib of the *Scapula* internally, it having a peculiar Cavity a little under its *Neck*, and then growing fleſhy in its deſcent, doth joyn its ſelf to the inſide of the *Os Humeri*, where it meets with another fleſhy Origination both broad and fleſhy from the upper and back part of the ſame Bone, and there making one, is inſerted to the upper and outward part of the *Olecranum*, and is allowed an *Antagoniſt* to *Biceps Internus*.

This you have at Tab. XXI. Fig. I.

Brachialis Internus.

This aſſiſts the former.

THIS ariſeth from the inner Head of the *Os Humeri*, and becoming fleſhy, doth aſcend to the Middle of the ſame, almoſt inſeperably mixing its ſelf with the former, and is Inſerted partly fleſhy, and partly nervous to the outſide of the

Olicranum, in that part which we uſually lean on; and by ſome it is allowed one of the *Cubits Flexors.*

This you have at Tab XXI. Fig. I. *in its place.*

Anconæus.

This extends the *Cubite.*

THIS being a ſmall bodied Muſcle, is by ſome *Anatomiſts* ſuppoſed to be a part of the *Brevis*, it has the Name of *Anconæus* given it, from its Situation, as *Riolan* ſuppoſeth, it ariſing fleſhy from the lower and back part of the *Os Humeri*, and is planted between the *Cubite*, and the *Radius*; being inſerted with a Nervous Tendon into the ſide of the *Ulna*, a Thumbs length below the *Olicranum* or *Elbow*, and is ſaid to aſſiſt in Extending both of *Longus & Brevis.*

This has no Figure *here.*

Gemellus.

This extends the *Cubite.*

IT hath its Name from its double Origination, it firſt ariſing Tendinous from the upper part of the *Lower Rib* of the *Shoulder-blade* in its ſide, and growing fleſhy in its march, doth joyn its ſelf with its other Origination; it appearing broad and fleſhy from the upper and back part of the *Os Humeri*, where ſhewing its ſelf firſt outwardly Tendinous, and then inwardly fleſhy, is plainly ſeen to Inſert its ſelf into the upper and outward part of the *Olecranum*, it being generally allowed one of the *Cubits* Extenſors.

This you have at Tab. XXI.

Palmaris.

This contracts the *Hand.*

THE Uſe of the Hand doth evidently demonſtrate in Diſſection, that the Bones of the Fingers are not made of one Shape and Size; but that they are rather framed of a different Set of Bones, formed for the moſt part round, and covered with Muſcles and Skin, they being alſo ſomewhat depreſt in their upper and lower parts, for the better enabling them

TAB. XXII

Fig. 1.

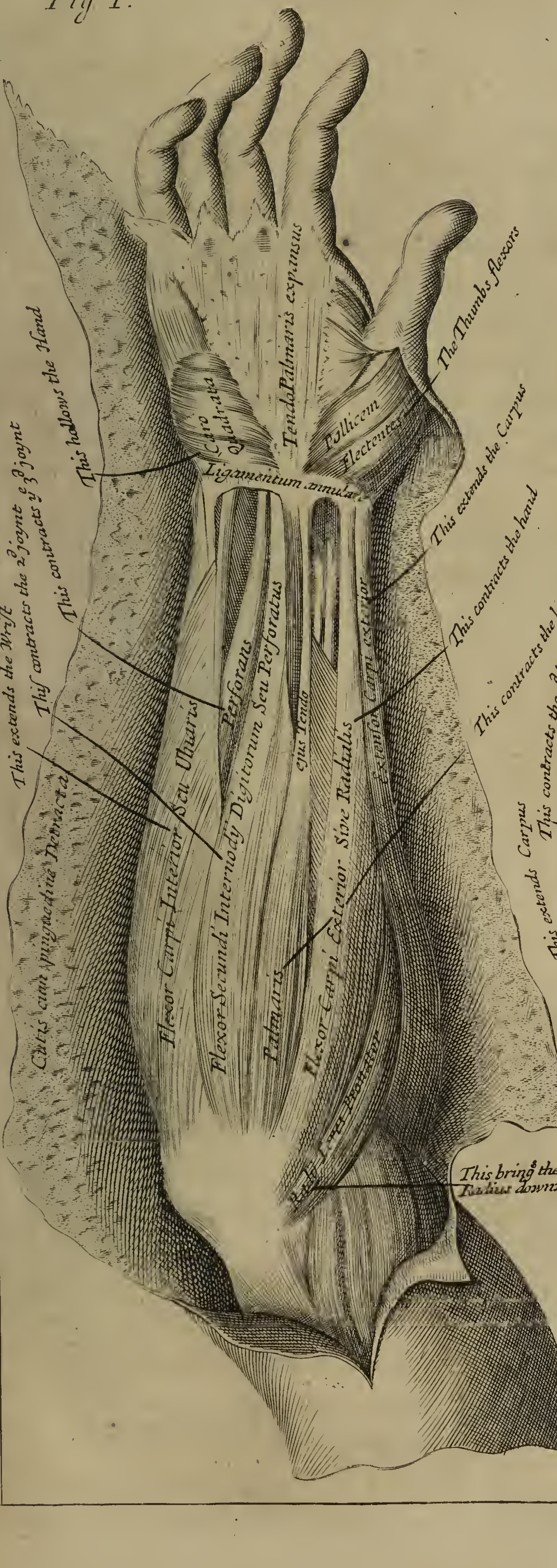
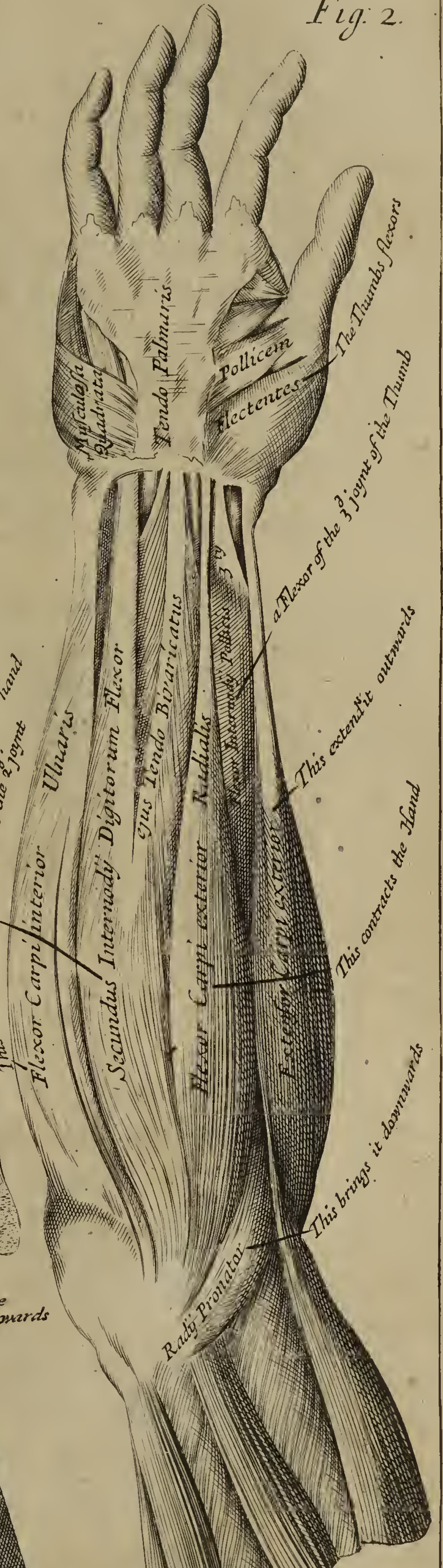


Fig. 2.



to gripe or graſp any tactile thing, within their Touch; and they are alſo made leſs and leſs in their Terminations, that they may with more eaſe cloſe with any Object in Contraction: This Muſcle ariſing ſomewhat round and nervous, from the inner Extuberance of the *Os Humeri*, doth afterwards become fleſhy, and narroweth it ſelf about the middle of the *Cubite*, where being carryed ſomewhat obliquely, is afterwards turn'd into a long and round *Tendon*, and paſſing over the inner Ligament of the *Radius*, it arrives at the *Palm*, where it expands its ſelf into a very broad *Tendon*, and is laterally inſerted into the roots of the Fingers, and ſo cloſely fixed to the *Cutis*, that without difficulty its ſcarce ſeparable thence.

This being contracted, does occaſion a faſt graſping of any tactile thing, and the Skin over it being movable, doth make the Gripe ſtronger and more fixing.

Obſervat.

The *Hand*, as both *Ariſtotle* and *Galen* write, is the *Organ* of *Organs*, and as the *Tongue* was allowed us for Speech and Converſation, ſo this is given us for Commerce and Trade; the *Hand* obligeth and ſupplies all our Faculties, thus the *Eye* obſerves all its Actions, it has the *Ear* at its Fingers ends, it ſupplies the *Noſtrils* with Perfumes, it raiſes a *Guſto* to the *Palate*, and its ſeldom or never ſeen without the Senſe of *Feeling*: Its the *Hand* that delivers the *Scepter* to the *Prince*, that gives the *Lawrel* to the *Victor*, that pays *Cæſar* his Due; our *Hands* are the *Regiſters* of all our *Laws*, and the very *Nerves* and *Sinews* of all our *Government*; by them we ſalute and embrace our Friends, and defend and guard our ſelves againſt our *Enemies*; theſe are the *Inſtruments* that wage War abroad, and theſe are the happy Maſters of all *Arts* and *Sciences*, of all *Profeſſions* and *Trades*, exerciſed in the times of Peace at home; with theſe we *Work* and we *Write*, we *Cut* and we *Cure*, and whatever *Good* or *Ill* we do, are the *Works* of our *Hands*; ſo that we may in the whole, account them either our beſt *Friends*, or our worſt of *Enemies*.

Hiſtory.

Valleriola Lib. 3. *Enarrat.* 8. tells us of one, who having received a very ſlight Wound in the Palm of his Hand, (ſcarce entring beyond the Skin) afterwards fell into Convulſions, and dyed on the 7th. day after the Receipt of the *Wound*.

This you have at Tab. XXII. Fig. I. *and at* Tab. XXIII. Fig. I. *it is laid bare.*

Caro Muſculoſa Quadrata, or *Palmaris brevis.*

This hollows the *Hand.*

THIS has its Name from its Shape and its Origination; it ariſeth in the lower part of the *Mons Lunæ*, as *Diemerbroeck* writes, or as *Fallopius* ſays, from the eighth Bone of the *Carpus*; and marching under the *Palmaris*, even to the middle of the Palm of the Hand, is inſerted into the outſide of the *Tendon*, which divides the Little Finger from the reſt.

Uſe.

This Muſcle hollows the Hand in its Contraction, drawing the *Mons Lunæ* to the middle of the *Hand.*

This you have at Tab. XXII. Fig. I, II. *and at* Tab. XXIII. Fig. I.

Flexor Carpi Exterior, Radialis, or *Bicornis.*

This helps the former in Contraction.

IT has the firſt Name from its Uſe, and *Radialis* from its Situation, and *Bicornis*, it ſhewing its ſelf with a double *Head*; it ariſeth tendinous from the inner Extuberance of the *Os Humeri*, and running ſomewhat tranſverſly, near the outward part of the *Primi Digitorum Flexores*, is fixed to the *Radius*, and a little before its arrival at the *Carpus*, in its oblique Progreſs, it becomes a flat *Tendon*, and paſſing over the *Tranſverſe Ligament*, does there begin to enlarge its ſelf, and is inſerted into that *Os Metacarpi* which ſecures the Fore-finger; theſe two acting together, do both contract the *Wriſt* and the *Hand*; one only acting, it brings it ſomewhat obliquely lateral in its Contraction.

This you have at Tab. XXII. Fig. I, II. *and at* Tab. XXIII. Fig. I.

Flexor Carpi Interior, or *Ulnaris.*

This contracts the *Wriſt.*

IT hath its Name upon its ariſing from the inner *Extuberance* of the *Arm*, and *Ulnaris*, it ariſing alſo from the upper and outward part of the *Ulna*; it being a Muſcle that is both ſharp, fleſhy and nervous, ariſing from the inner *Proceſs* of the *Os Humeri*, and running fleſhy the length of the *Cubite*, to which it adheres, hath its Inſertion by a ſhort and ſtrong *Tendon*, at the fourth Bone of the *Radius*, being partly fleſhy, and partly

TAB.XXIII.

fig.1

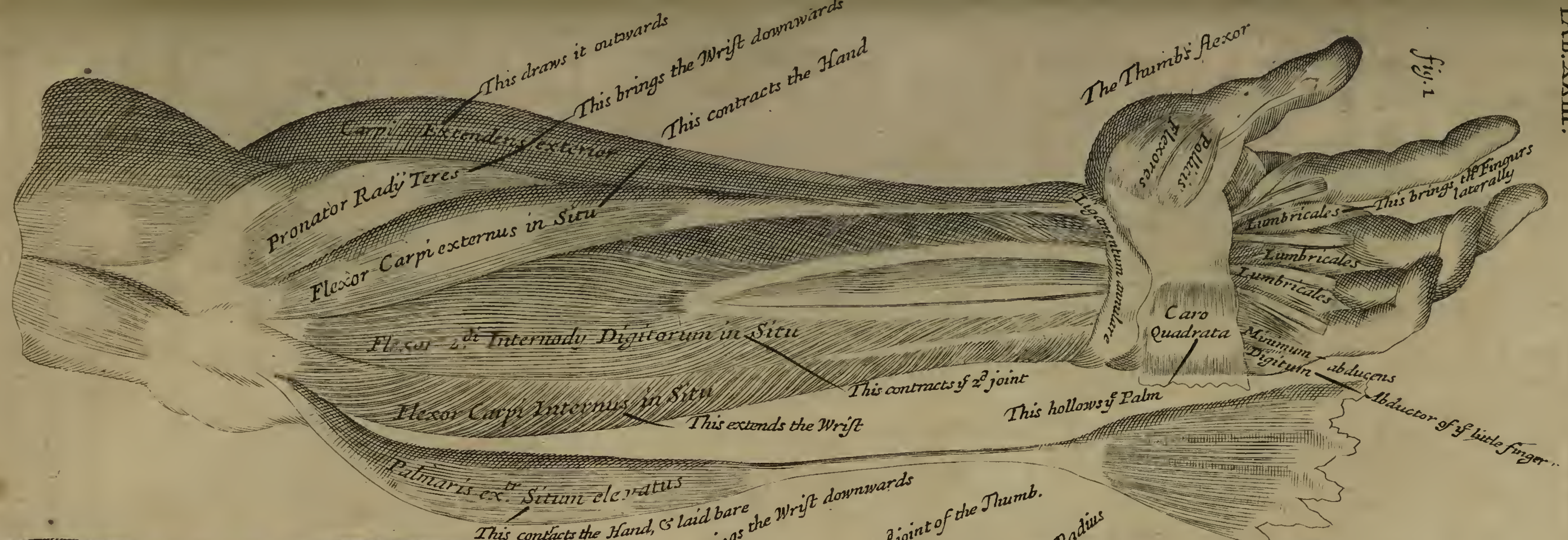
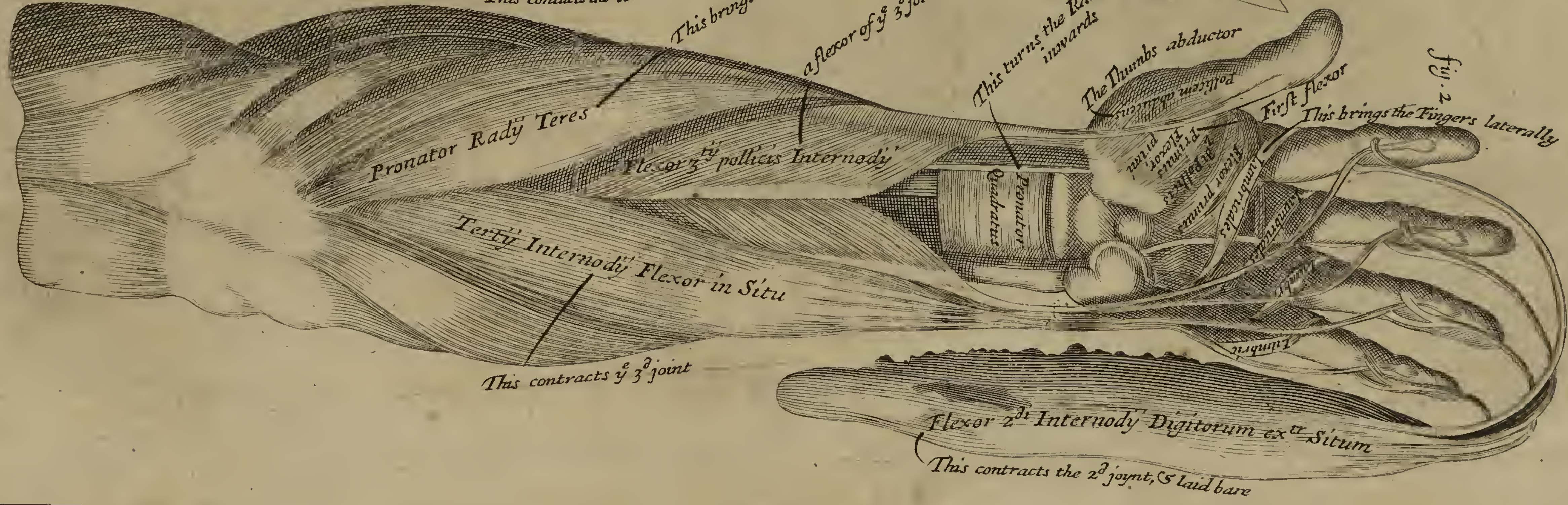

This draws it outwards
This brings the Wrist downwards
This contracts the Hand
The Thumbs flexor
Carpi Extendens exterior
Pronator Radij Teres
Flexor Carpi externus in Situ
Flexor 2dt Internody Digitorum in Situ
This contracts ye 2d joint
Flexor Carpi Internus in Situ
This extends the Wrist
Palmaris ex.tr Situm elevatus
This contracts the Hand, & laid bare
Pollicis
Flexores
Ligamentum annulare
Lumbricales
This brings the Fingers laterally
Lumbricales
Lumbricales
Caro
Quadrata
Minimum
Digitum
abducens
Abductor of ye little finger
This hollows ye Palm

fig. 2


This brings the Wrist downwards
a flexor of ye 3d joint of the Thumb.
This turns the Radius inwards
The Thumbs abductor
Pollicem abducens
First flexor
This brings the Fingers laterally
Pronator Radij Teres
Flexor 3tij pollicis Internodij
Pronator
Quadratus
Primus
Flexor
primi
2di Pollicis
Flexor primus
Lumbricales
Lumbricales
Lumbric
Tertij Internodij Flexor in Situ
This contracts ye 3d joint
Flexor 2dt Internody Digitorum ex.tr Situm
This contracts the 2d joynt, & laid bare

nervous, and doth not paſs under the *Tranſverſe Ligament*, but is only wrapt up in the common Membrane of all the *Muſcles*.

The Uſe of theſe *Flexors* is, that as they are made for receiving any thing into them, ſo they always ariſe in the inſide of the *Arm*, while we plainly perceive the *Extenſors* do take their Originations from the outward Extuberance thereof: Its Uſe.

This you have at Tab. XXII. Fig. I, II. *and at* Tab. XXIII. Fig. I. II.

Extenſor Carpi Exterior, Radialis, or *Bicornis.*

IT hath its firſt Name from its Office, and its other two from its Situation and Make; it has two Originations, the outermoſt of which ariſeth fleſhy above the outer Extuberance of the *Os Humeri*, and in its declining march, it becomes a fleſhy Belly, and above the middle of the *Radius*, it appears nervous; the other is partly fleſhy, and partly nervous underneath the former, and continues the ſame according to its length; but having arrived near half way, it is converted into a ſtrong *Tendon*, and is afterwards inſerted by a double Tendon into the firſt and ſecond Bones of the Fore and middle Fingers; and in reſpect of its double Origination, and Inſertion, it is alſo called *Geminus*. This extends the *Carpus*.

This you have at Tab. XXII. Fig. I. *and at* Tab. XXIII. Fig. I. *and at* Tab. XXIV. Fig. I, II. *and at* Tab. XXVI. Fig I, II.

Extenſor Carpi Interior, or *Ulnaris.*

THIS ariſing from the inner Extuberance of the *Arm*, as alſo from the Top of the *Cubite*, and being dilated all its whole Length thro' it near the *Carpus*, it is converted into a ſtrong and round Tendon, by which it inſerts its ſelf into a *Sinus*, above the lower end of the *Cubite*, and to the 5th. Bone of the *Carpus*. This extends the *Wriſt*.

Nature hath framed two ſets of Bones for making the *Carpus* or *Wriſt*; by the Benefit whereof, the firſt is joyned to the *Radius*, and the ſecond to the *Metacarp*, and the firſt Bone of the *Thumb*; the upper being ſo cloſely put together, that they all ſeem but as one Bone, which is taken in as it were Obſervat.

into the *Sinus* of the *Radius*, making up an Articulation in the lower part of the *Cubite*, and the firſt and ſecond Bone of the *Carpus*; being alſo let in as it were into a *Sinus*, hollowed at the *Appendix* of the *Radius*, and the third Bone thereof; all which are thus prudently managed, for the Performance of thoſe various Offices, which we dayly ſee the Hand and Fingers exerciſed with; as alſo by the Benefit of theſe aforeſaid Muſcles, we plainly ſee the Arms either to be carryed upwards, or brought downwards, or drawn ſideways, as we pleaſe to move them.

This you have at Tab. XXII. Fig. I, II. Tab. XXIII. Fig. I. *and at* Tab. XXIV. *it is laid bare, and you have it again at* Tab. XXVI. Fig. I, II.

Perforatus, or *Flexor ſecundus.*

This contracts the 2d. Joynt of the *Fingers.*

THIS has its Name, from its ſuffering the Tendons of the next Muſcle to paſs thro' it, and is alſo called *Flexor ſecundi Internodii Digitorum*, from its Uſe: The Bones of the *Metacarp* carrying an equal Correſpondence with that of the Fingers, being as it were their next Neighbours, are of no ſmall uſe towards the ſupporting them; theſe alſo being larger in their upper parts, than in their lower; *Nature* contriving them ſo on purpoſe, for their taking in of their Muſcles into their empty Spaces, which they are ſeen to have between the Bones of the *Metacarp*, framing theſe as ſo many proper Lodgments for there ſeveral Receptions; and therefore they are not only ſeen furniſhed with *Appendages* for their better Terminations, but have alſo allowed them *Aſperities*, for the more ready Admiſſion of their tendinous Inſertions: This Muſcle ariſeth nervous from the inner Protuberance of the *Os Humeri*, and growing broad and fleſhy about the middle, between the *Cubitus* and *Radius*, ſomewhat adjoyning its ſelf to them in its march, it wholly becomes fleſhy and round; after this, it divides its ſelf into four fleſhy Portions, from each of which are ſent out as many *Tendons*, every one of them being involved in a *Mucaginous* Coat or Membrane, and running internally under the *Tranſverſe Ligament* of the *Carpus*, till it reacheth the *Palm*, and afterwards is ſeen to diſtribute theſe its perforated Tendons to the firſt and ſecond *Internodes* of the Fingers, a little before their

TAB. XXIIII

FIG. I

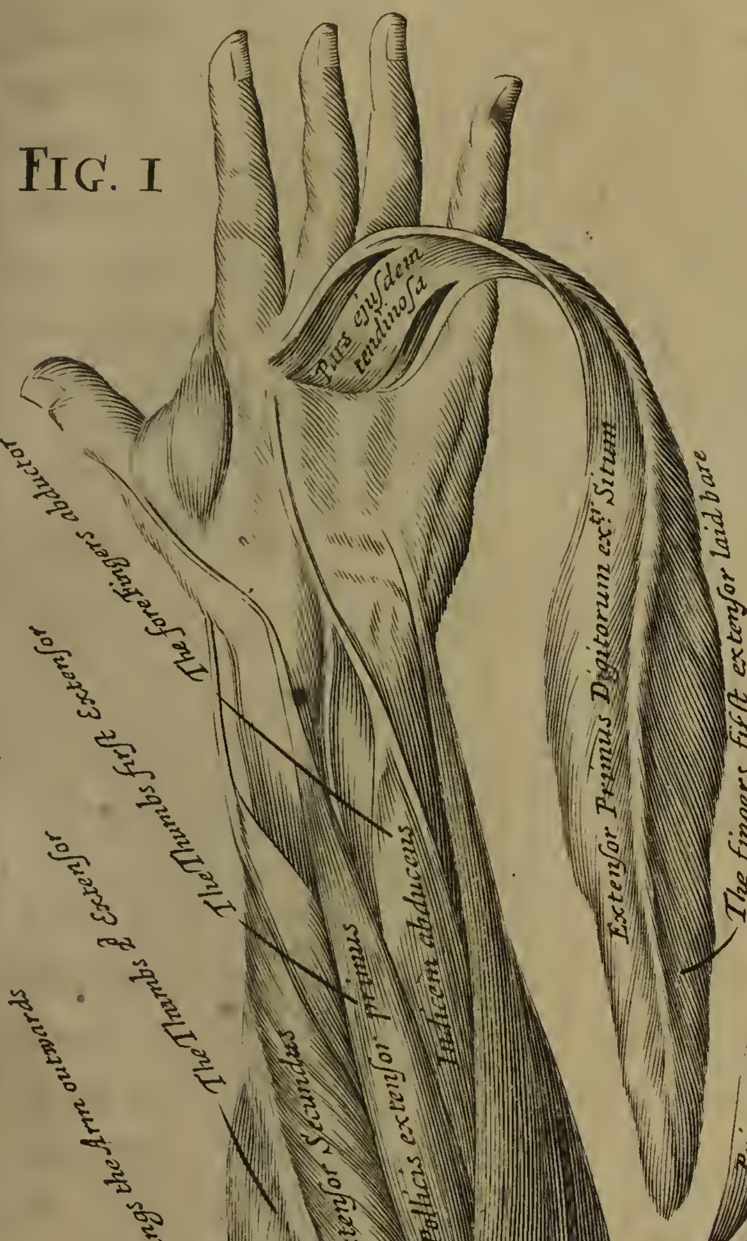
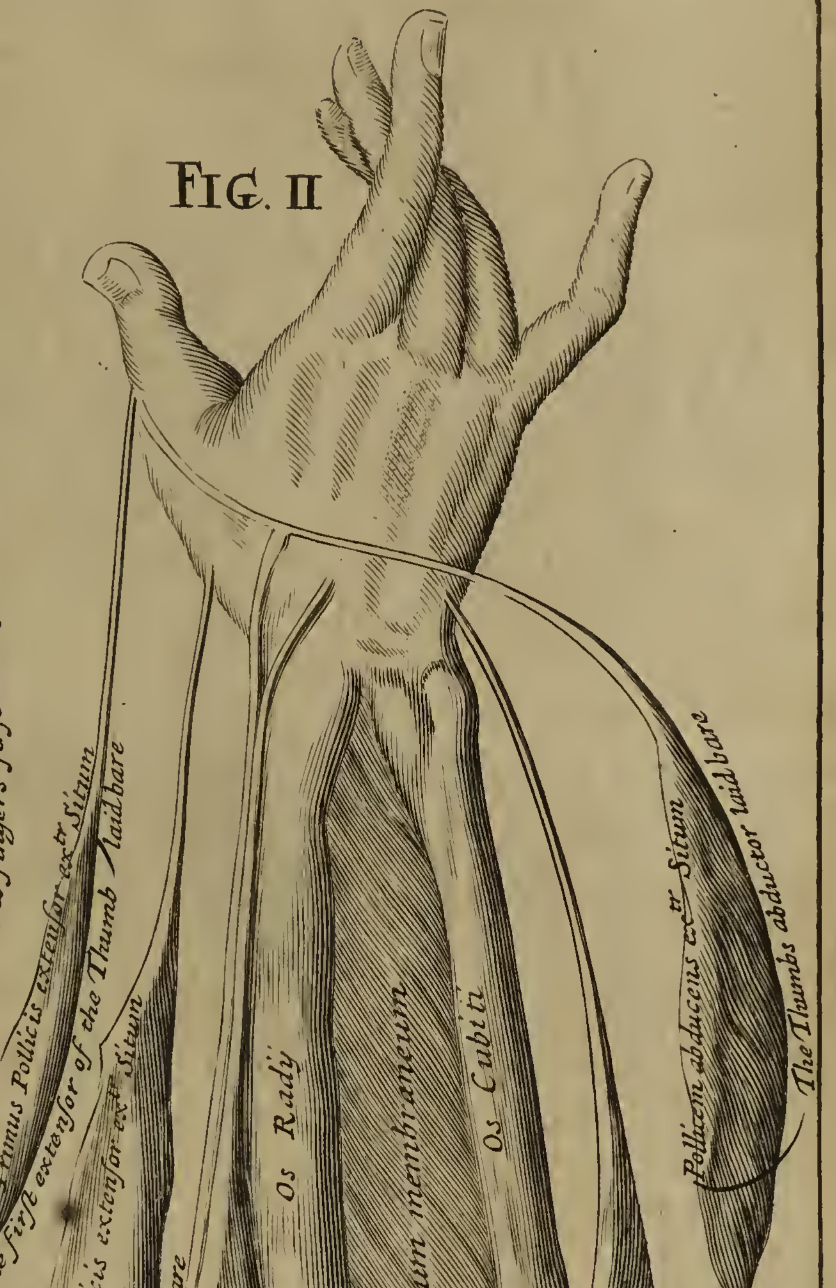

Pars ejusdem tendinosa
The fore fingers abductor
The Thumbs first extensor
The Thumbs 2d extensor
This brings the Arm outwards
This extends the Carpus
Extensor Carpi ext.
Radij Supinator brevis
Pollicis extensor Secundus
Pollicis extensor primus
Indicem abducens
Extensor Digitorum Secundus
Extensor Primus Digitorum ext. Situm
The fingers first extensor laid bare
The 2d Extensor of the fingers

FIG. II


Primus Pollicis extensor ext. Situm
The first extensor of the Thumb laid bare
Secundus Pollicis extensor ext. Situm
The 2d extensor of the Thumb laid bare
This extends the Carpus outwards
Extensor Carpi exterior
Os Radij
Ligamentum membranosum
Os Cubiti
Secundus Radij brevis
Extensor Carpi interior
This extends the Wrist
This brings the Arm outwards
Pollicem abducens ext. Situm
The Thumbs abductor laid bare

their Inſertions, for the more ready Tranſmiſſion of the *Tendons* of the *Perforans*, or the *Tertii Internodii Flexor.*

This you have at Tab. *XXIII.* Fig. *II.* Tab. *XXII.* Fig. *I, II. it is laid bare.*

Perforans, or *Flexor tertius.*

THIS hath its Name from its Tendons paſſing thro' the former Muſcle; it ariſeth fleſhy from the upper part of the *Cubite*, a little beneath the Joint of the *Radius*, becoming a thick bellyed *Muſcle*, and then growing outwardly nervous, doth divide its ſelf into four *Tendons*, which paſſing under the former, and then thro' their Clefts, is implanted into the Fore-part, and third Bone of every Finger.

This contracts the 3d. Internodes.

Nature hath made a very excellent Order in the forming theſe Muſcles, that each of them may freely act without prejudicing each other; as alſo for ſecuring them in their proper Motions, ſhe hath cut a way through the former, for theſe to paſs freely in order to their Operations; and not only ſo, but theſe alſo are ſo framed, that they are ſeen to move without any Injury to the former.

Obſervat.

This you have at Tab XXIII. Fig. II. *and at* Tab. XXII. Fig. I.

Extenſor Digitorum Communis.

THIS ariſeth partly fleſhy, and partly nervous, from the outward *Apophyſis* of the *Os Humeri*, and becoming more fleſhy, in leſs than half its Progreſs, it is ſeen to narrow its ſelf, where it is alſo divided in three fleſhy Portions, which afterwards do terminate in as many *Tendons*, all which are included in a common thin mucaginous Coat, and paſſing under the Annular Ligament, being thus divided, they are inſerted into the upper parts of the firſt, middle, and third *Bones* of the Fore, middle, and third Fingers.

This extends the 2d. and 3d Internodes of the *Fingers*

Theſe Tendons reaching the Ends of the third Bone, and lodging under the Nail, ſhews us the reaſon of thoſe ſharp pains, which uſually happen upon a Prick, or a *Fellon* here growing or breeding on theſe parts.

Obſervat.

This you have at Tab. XXIV. Fig. I. *laid bare.*

Indicis Extenſor, or *Indicator.*

This extends the Fore-finger.

THIS proper *Extenſor* of the Fore-finger, which both by *Riolan* and *Veſlingius* is called *Indicator*, ariſeth from the outward and middle part of the *Cubite*, next the *Radius*; and deſcending obliquely, do paſs under the Annular Ligament, with a double *Tendon*, into the ſecond Joynt, and meeting with the Tendon of *Extenſor Communis*, is carryed to the third Bone of the Fore-finger.

Hiſtory.

I cannot paſs by the Story I met with in *Pet. Borellus*, *Obſ* 28, *Cent.* 1. of a Fiſherman about *Montpelier*, who being wounded in his Fore-finger with a ſharp Bone or *Spine* of a Fiſh, not only an extraordinary Pain did ariſe upon it, but a large Tumour followed it, which Tumour could not be cured by any Medicine whatſoever; at length it being laid open by a Surgeon, there was found in the middle thereof, a ſmall Fiſh near formed, carrying in it much the Shape of that Fiſh, whoſe *Spine* made the Wound.

This you have at Tab. XXIV. Fig. I.

Lumbricales, or *Vermiculares*, or *Flexores primi Internodii.*

Theſe contract the 1ſt. Joynts laterally.

THEY have their Names from the likeneſs they carry with common *Earth-worms*, conſidering their Shapes; and are alſo called *Flexores primi Internodii*, from their Uſe, they ariſing from the *Tendons* of the *Perforans*, intermixing themſelves therewith; and being then again ſegregated thence, and growing fleſhy, do intermix themſelves with ſome of the *Interoſſei*, running out of the ſides of the *Fingers*, even to the third Joynt, bending them laterally.

This is ſhewn at Tab. XXIII. Fig. I, II. *and at* Tab. XXV. Fig. I.

Flexor tertii Internodii Pollicis.

This bends the 3d. Joynt of the *Thumb.*

THIS oft times hath ſhewn its ſelf with a double Origine, it firſt ariſing fleſhy, from the inner Extuberance of the

Fig. I.

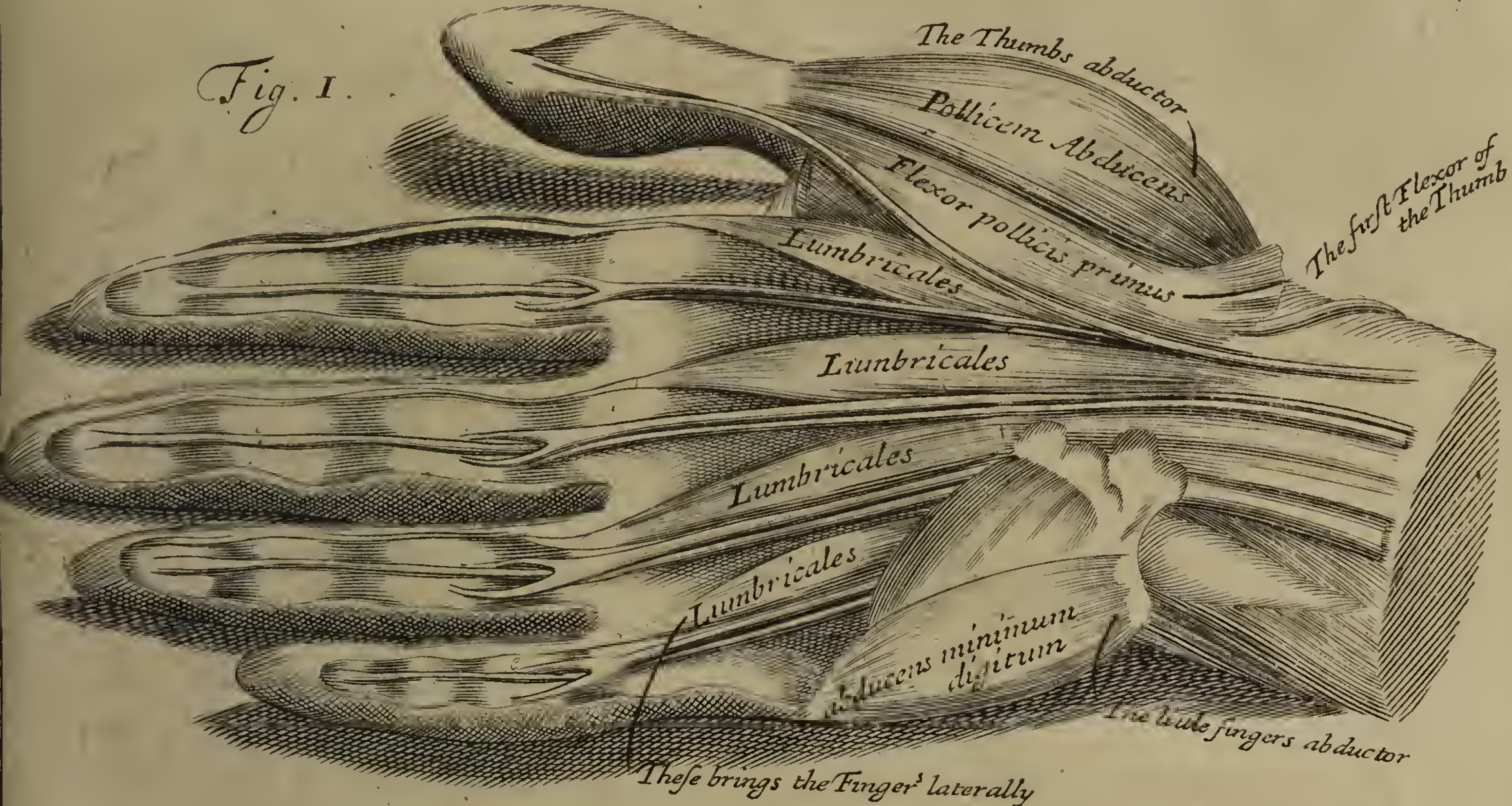
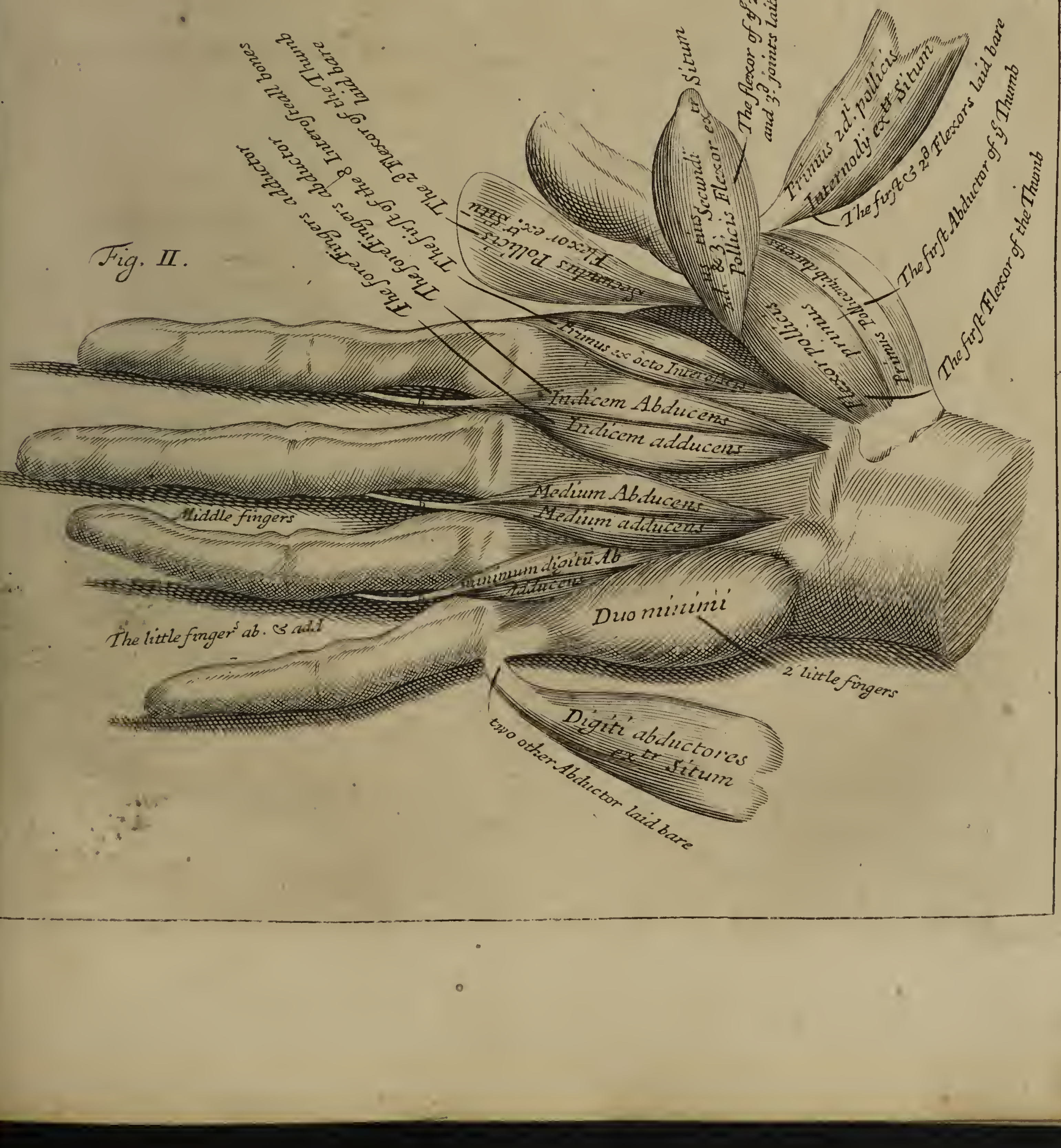

The Thumbs abductor
Pollicem Abducens
Flexor pollicis primus
The first Flexor of the Thumb
Lumbricales
Lumbricales
Lumbricales
Lumbricales
Abducens minimum digitum
The little fingers abductor
These brings the Fingers laterally

Fig. II.


The fore Fingers adductor
The fore Fingers abductor
The first of the 8 Interosseall bones
The 2d Flexor of the Thumb laid bare
Secundus Pollicis Flexor ex.tr Situ
Tertius Secundi et 3. Pollicis Flexor ex.tr Situm
The flexor of ye 2d and 3d joints laid bare
Primus 2di pollicis Internodij ex.tr Situm
The first & 2d Flexors laid bare
Pollicem abducens
The first Abductor of ye Thumb
Flexor pollicis primus
Primus
The first Flexor of the Thumb
Primus ex octo Interosseis
Indicem Abducens
Indicem adducens
Medium Abducens
Medium adducens
Middle fingers
minimum digitũ Ab adducens
The little fingers ab. & add.
Duo minimi
2 little fingers
Digiti abductores ex.tr Situm
two other Abductor laid bare

the *Os Humeri*, partly fleſhy, and partly nervous; and then from the upper part of the *Radius*, running forwards to the firſt and ſecond Joynts of the *Thumb*, and doth implant its ſelf at the upper part of the third Bone thereof.

This you have at Tab. XXII. Fig. I, II. *and at* Tab. *XXIII.* Fig. *I, II.*

Flexor primi & ſecundi Internodii Pollicis.

This bends the 1ſt. and 2d. Joynts of the *Thumb*.

THIS ariſeth fleſhy from the *Ligamentum Annulare*, and from the Bones of the *Carpus*, under the former, and is extended to the middle of the *Thumb*; its variety of Motions ariſing from its diverſity of Fibres allowed it, and it is generally allowed a *Flexor* of the firſt and ſecond *Internodes* of the *Thumb*, from whence it properly takes its Name. *Riolan* will not allow this a a *Flexor*, but thinks, that theſe Muſcles ariſing from the Bones of the *Carp* or *Metacarp*, ought rather to be called either *Abductors* or *Adductors*.

This you have at Tab. *XXII.* Fig. *I, II. and at* Tab. *XXIII*, Fig. *I, II*,

Pollicis Abductor.

This draws the *Thumb* from the *Fingers*.

THE *Thumb*, when it is drawn to any ſide, is ſaid to be either adduced or abduced; this *Abductor* ariſeth broad and fleſhy from the inner part of the *Tranſverſe Ligament* of the *Carpus*, and leſning its ſelf in its deſcent, at its inſertion becomes tendinous, marching along to the upper and ſecond Bone of the *Thumb*, drawing it from the Little Finger; by ſome *Anatomiſts*, this is called *Thenar*.

This you have at Tab. *XXIII.* Fig. *II. and at* Tab. *XXV.* Fig. *I, II.*

Pollicis Adductor.

This draws the *Thumb* inwards.

THIS ariſeth nervous, as did the *Indicis Abductor*, and then growing fleſhy, doth aſcend obliquely to the upper part of the firſt Bone of the *Thumb*, where, at its inſide, it is inſerted broad and fleſhy, and by ſome this is called *Antithenar*, and is allowed to bring the *Thumb* towards the Fore-finger, whence it gets the Name of *Adductor.*

This you have at Tab. XXVI. Fig. II.

Extenſor primi Internodii Pollicis.

This extends the 1ſt. Internode of the *Thumb.*

THIS ariſeth tendinous from the upper part of the *Ulna*, under the *Supinator Radii brevis*, and then growing fleſhy, does again appear nervous in its oblique deſcent over *Radii Extenſor*, and is implanted into the firſt Bone of the *Thumb.*

This you have at Tab. *XXIV.* Fig. *I. and at* Fig. *II. it is laid bare.*

Extenſor ſecundi & tertii Internodii Pollicis.

This extends the 2d. and 3d. Joynts of the *Thumb.*

THIS ariſeth broad and fleſhy from that part of the *Radius*, near the *Ulna*, and obliquely aſcending over it, doth divide its ſelf into two inequal parts cloſely put together, and is carryed along in a proper Channel to the *Appendix* of the *Radius*, its upper part being ſomewhat fleſhy, and afterwards ending in a round Tendon, is inſerted into that Bone of the *Carpus*, which receives the *Thumb*; the other being ſubdivided into two ſmall Portions of Fleſh, doth at length likewiſe become tendinous, the firſt of theſe being inſerted into the firſt Joynt of the *Thumb*; the other by a Membrane fixeth its ſelf to the ſecond and third Joynts thereof, and is ſaid to extend them.

This you have at Tab. *XXIV.* Fig. *I, II.*

Interoſſei Manus.

Theſe bring the Fingers laterally.

THE *Fingers* are brought to the ſides, or to the *Thumb*, or drawn from thence by the help of theſe Muſcles, they being allowed eight in number, and are divided into Externals and Internals, being fleſhy and ſmall Muſcles, ariſing inwardly fleſhy from the upper Bones of the *Metacarp*, near the *Carpus*, and

TAB. XXVI.

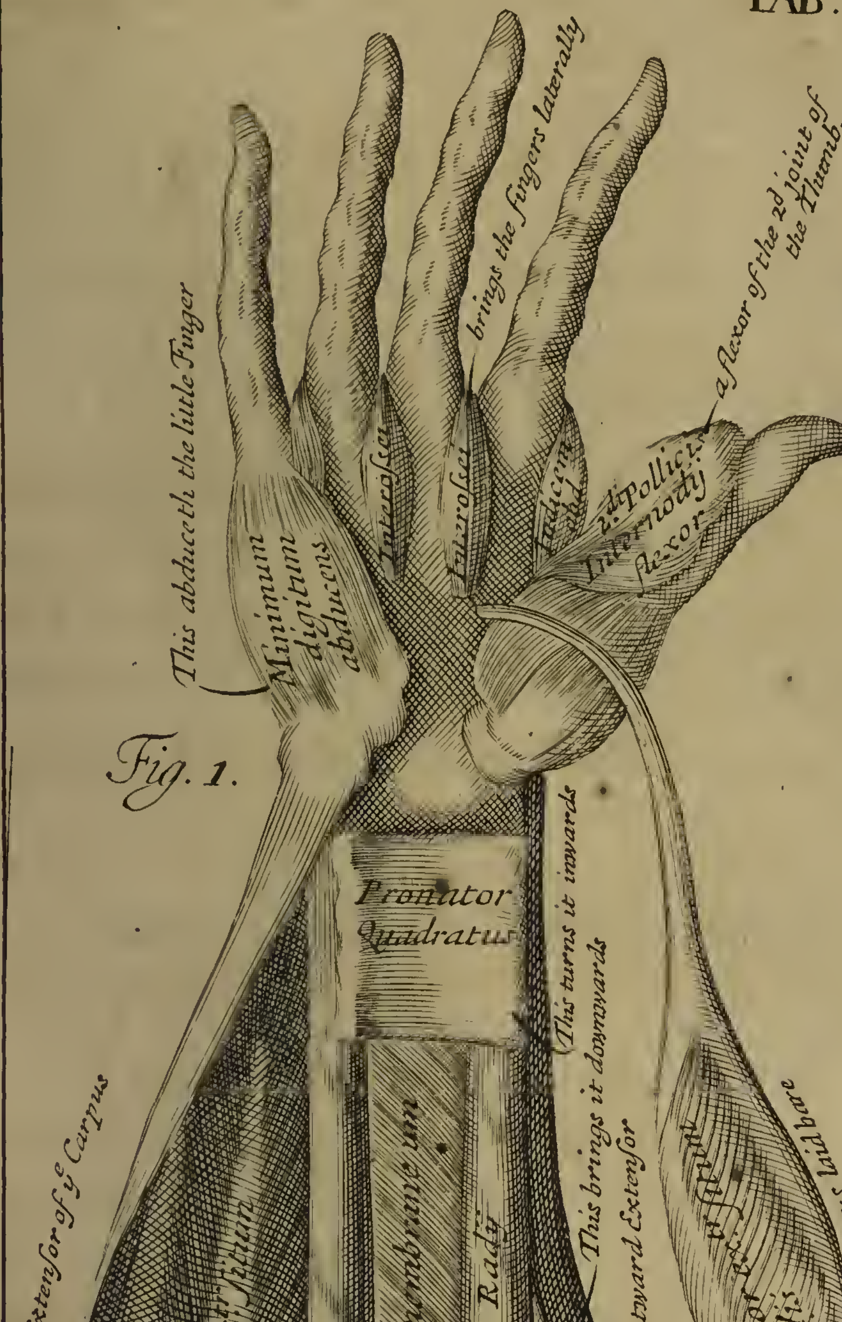


Fig. 1.
This abducteth the little Finger
Minimum digitum abducens
Interossei
Interossei
brings the fingers laterally
Interni
2dus Pollicis Internodij flexor
a flexor of the 2d joint of the Thumb.
Pronator Quadratus
This turns it inwards
This brings it downwards
The outward Extensor
The inward Flexor & Extensor of ye Carpus
Carpi flexor et extensor internus sive Ulnaris
Os Cubiti
Ligamentum membraneum
Os Radij
Pronator Radij teres
Carpi extensor exterior.
Externus Carpi flexor et extensor sive Radialis
The outward Flexor of the Carpus

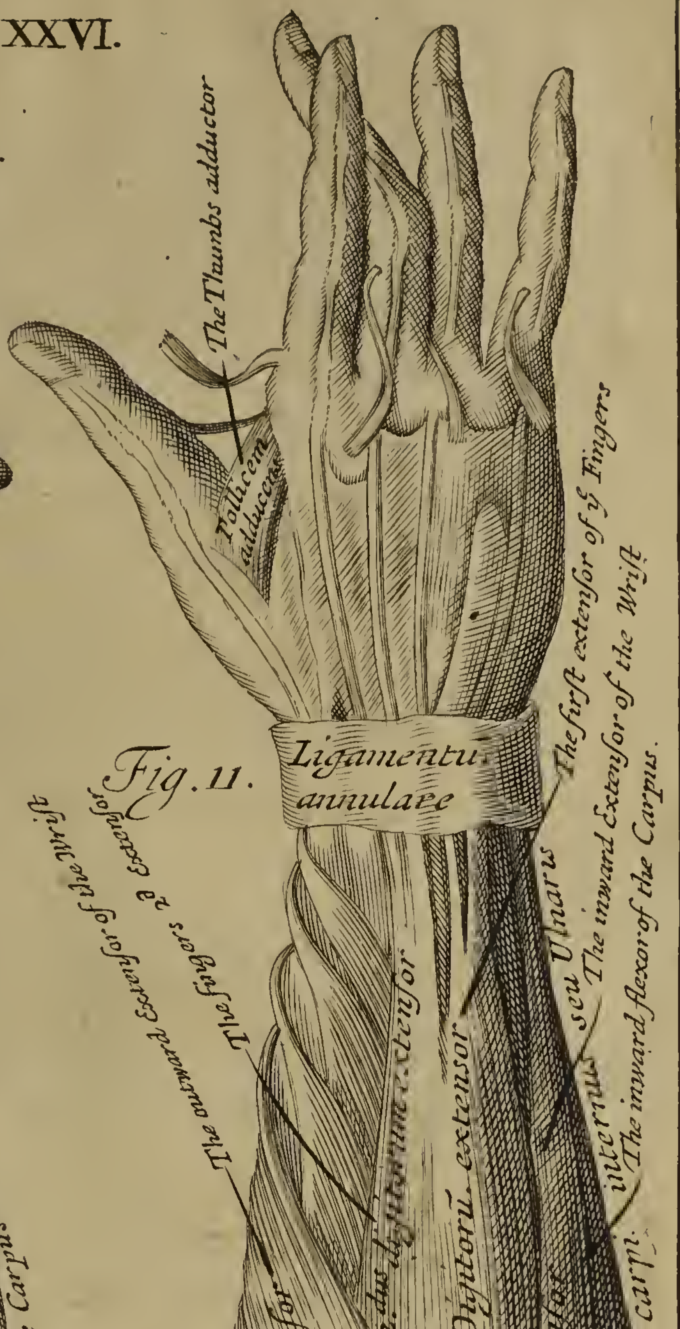


Fig. 11.

and intermixing with the *Lumbricales*, become tendinous at the firſt Joynt of every Finger laterally, and marching to their Inſertions, their Tendons are ſeen to end at the roots of the Nails, ſix of them are planted into the three *Internodes* of the Bones of the *Metacarp*, viz. two into every one; and as one is planted inwards, the other is planted outwards whilſt the others are ſeen more particularly to belong to the firſt Bone of the *Metacarp*, faſtning the *Index*; and is alſo incumbent on that part which doth receive the *Thumb*; the laſt adhering to the laſt Bone of the *Metacarp* in the outward part of the Hand, or in the back part thereof.

When they work together, they bring the Fingers nearer each other, and do alſo promote their Extenſions, as *Galen* obſerves. Uſe.

This you have at Tab. XXV. Fig. I, II. *and at* Tab. XXVI Fig. I.

Auricularis, or *Minimi Digiti Extenſor.*

This extends the Little *Finger.*

THIS ariſeth partly nervous, and partly fleſhy, nervous at the end of the outward *Apophyſis* of the *Os Humeri*, and partly fleſhy from the upper part of the *Ulna*, and is outwardly implanted with a double Tendon into the Little Finger; and having paſt under the *Annular Ligament* at the *Carpus*, it becomes a large, round and nervous Tendon; which is inſerted into the third Bone of the Little Finger, it intermixing its ſelf in its paſſage, with the Tendon of the *Tenſor Communis*.

Horatius Augenius Lib. 9. *Epiſt.* 2. writes, That he obſerved *John Baptiſt Argentine* dyed of a Wound of his Little Finger. Obſervat.

This you have at Tab. XXIV. Fig. II.

Minimi Digiti Abductor.

This draws off the Little *Finger.*

THIS *Muſcle* is planted in the bottom of the *Hand*, under the *Little Finger*, ſhort and ſtrong; it ariſing fleſhy from the fourth Bone of the *Carpus*, as alſo from its third Bone; and from the upper part of the ſubjacent *Metacarp*, and extending its ſelf by it, is inſerted laterally outwards, to the firſt Joynt of the Little Finger, and doth abduce it; *Riolan* writes, that this may be divided into two *Muſcles*.

This you have at Tab XXIII. Fig. I, *and at* Tab. XXV. Fig. I. II. *in its place, and laid bare.*

Pronator Quadratus.

This turns the *Wriſt* inwards.

THIS ariſeth broad and fleſhy, (being tranſverſly extended) from the lower and inner ſide of the *Ulna*, and ſo paſſing over the *Ligament*, that joyns the *Radius* and the *Ulna*, doth implant himſelf into the upper and outward part of the *Radius*, with a broad Beginning, much reſembling a *mathematical Square*, with four equal ſides.

Hiſtory.

Horatius Augen Lib. 9. *Epiſt.* 2. writes, that *Marcus Antonius* dyed of a ſmall Wound hapning in his *Elbow.*

This you have at Tab. XXIII. Fig. I, II. *and at* Tab. XXVI. Fig. I.

Pronator Radii Teres.

This brings the *Radius* downwards.

THIS is called *Teres* from its Form, it ariſing fleſhy from the *Radix*, of the inner Prominence of the *Os Humeri*, and from the inſide of the *Os Cubiti*, and is there joyned by a large fleſhy Origination to the *Radius*, and thence obliquely deſcending downwards by its ſide, a little above its middle, is implanted into him fleſhy, and afterwards a nervous Head or Tendon ariſeth from him, which is inſerted into the outward Head of the *Radius*, and is ſaid to bring it downwards.

This you have at Tab. *XXII.* Fig. *I, II.* Tab. *XXIII.* Fig. *I, II. and at* Tab. *XXVI.* Fig. *I.*

Supinator Radii Longus.

This brings the *Arm* outwards.

THIS has its Name from turning the *Radius* upwards and outwards; and *Longus*, from its length, it ariſing broad and fleſhy from the upper and outward part of the *Os Humeri*, and running obliquely inwards, it grows leſs in its deſcent, and becomes a flat, broad and membranous Tendon, and is faſtned to the outer and lower part of the *Radius* near the *Carpus*.

Uſe.

If this, and its Partner do act, they bring the *Radius* forwards, and the Hand with it.

This you have at Tab. *XXVII.* Fig. *I, II.*

Supinator Radii Brevis.

This aſſiſts the former.

THIS being ſhorter and thinner than the former, doth ariſe from the outward part of the lower Head of the *Os Humeri*,

Finis Prælectionis Quintæ

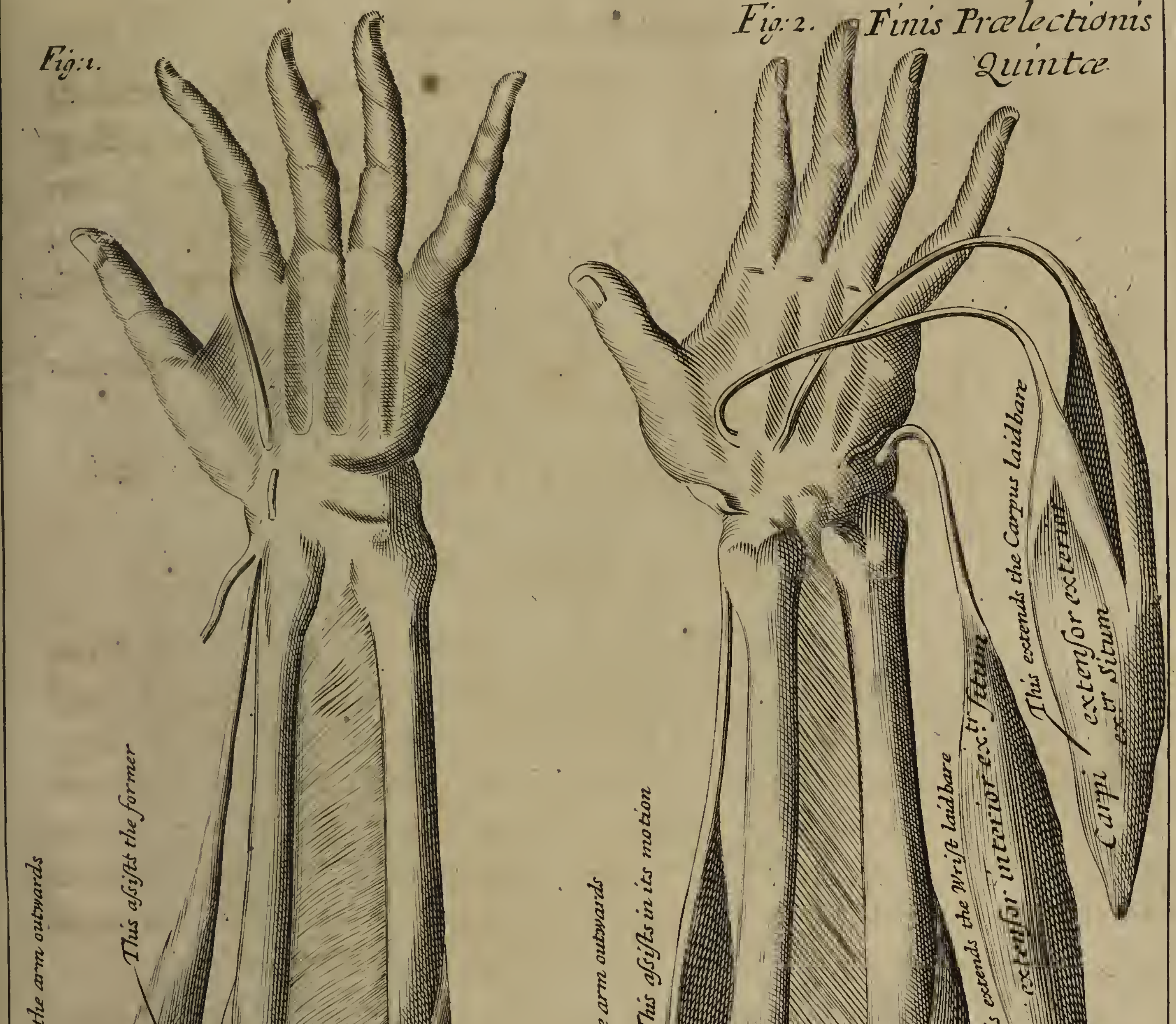


Fig: 1.
This brings the arm outwards
Supinator Radij longus
This aſsiſts the former
Supinator Radij brevis

Fig: 2.
This brings the arm outwards
Supinator Radij longus
This aſsiſts in its motion
Supinator Radij brevis
This extends the Wriſt laidbare
Carpi extenſor interior ex:ri ſitum
This extends the Carpus laidbare
Carpi extenſor exterius ex:ri Situm

meri, and from the Proceſs of the *Ulna*, partly tendinous, and partly fleſhy; and upon its recovering the middle of the *Radius*, is inſerted to its upper part, a little below its Prominence.

This you have at Tab. *XXIV.* Fig. *I, II. and at* Tab. *XXVII.* Fig. *I, II.*

Lecture VI.

This Laſt Lecture concludes with theſe following *MUSCLES*, viz.

Pſoas Magnus,
Pſoas Parvus,
Iliacus Internus,
Pectinæus,
Glutæus Major,
Glutæus Medius,
Glutæus Minimus,
Pyriformis,
Marſupialis,
Quadratus,
Triceps,
Obturator Externus,
Membranoſus,
Sartorius,
Gracilis,
Seminervoſus,
Semimembranoſus,
Biceps,
Rectus,
Vaſtus Externus,
Vaſtus Internus,
Suppoplitæus,
Gaſterocnemius Externus,
Plantaris,
Gaſterocnemius Internus,
Tibiæus Anticus,
Peronæus Primus,
Peronæus Secundus,
Tibiæus Poſticus,
Extenſor Pollicis,
Flexor primi & ſecundi Internodii Pollicis,
Abductor Pollicis,
Adductor Pollicis,
Extenſor Digitorum Longus,
Extenſor Digitorum Brevis,
Perforatus,
Perforans,
Lumbricales,
Abductor Minimi Digiti,
Tranſverſalis Placentini,
Interoſſei Pedis.

Pſoas Magnus, or *Lumbalis*.

HAving cleared the *Muſcles* belonging to the upper parts, and thoſe of the *Trunk*; we now arrive at the lower parts of the Body, beginning with the *Flexors* of the *Thigh*, where we firſt meet with *Pſoas*, which has its Name, ἐν τῷ περὶ ἄρθρων, they being *Muſcles* planted in the inner part of the *Loins*, as *Hippocrates* writes: And whereas

This Contracts the *Thigh*.

theſe parts are the proper *Pedeſtels*, on which the two former had their dependance; here may we ſee what Contrivance *Nature* hath made, in giving them a Syſtem of ſtrong Bones, ſo tyed together, and ſo artificially connexed, that they ſeem to be all of a piece, tho' indeed they are diverſe Bones cloſely put together, (for the better ſecuring of the *Trunk* of the Body) by the advantageous Ligaments allowed them, for the better faſtning them one to another: Thus we ſee, as it is tyed to the *Share Bone* before, and backwards to the *Os Sacrum*, and downwards to the *Coxendix*; ſo alſo is the *Foot* divided into three parts, the *Thigh*, *Leg* and *Foot*; to all which parts, *Nature* hath given the *Machiniſm* of *Muſcles*, as ſo many diſtinct Bodies, appointed as ſo many Machines of Motion: And *Man* being framed in an erect Poſture, and naturally requiring theſe bony *Pillars* to ſuſtain and bear up his *Fabrick*, which we ſee is every where well ſtored with various and different Bodies, and Forms of Muſcles, both for the better countermanding each other in their Motions, as alſo for keeping the Limbs in an erect Poſture.

I ſhall begin with this of the *Pſoas*, which is planted in the hollow or inſide of the *Abdomen*, and doth ariſe livid, fleſhy and large, from the two lower *Vertebres* of the *Thorax*, and the three upper of the *Loins*, and deſcending ſomewhat round from the inner part of the *Os Ileon*, even to the *Os Pubis* through its *Sinus*, is inſerted by a round and ſtrong Tendon into the leſs *Trochanter* of the *Thigh*, drawing it upwards, and at the ſame time bending it inwards. Becauſe the *Kidneys* do frequently preſs upon this *Muſcle*, as *Laurentius* well obſerves, over which runneth a notable *Nerve*; ſuch as are troubled with the *Stone*, do frequently perceive a Sleepineſs on that ſide of the *Thigh*, in which the *Stone* is lodged, occaſioned by its compreſſing this part.

This you have at Tab. XXVIII. *both in and out of its place.*

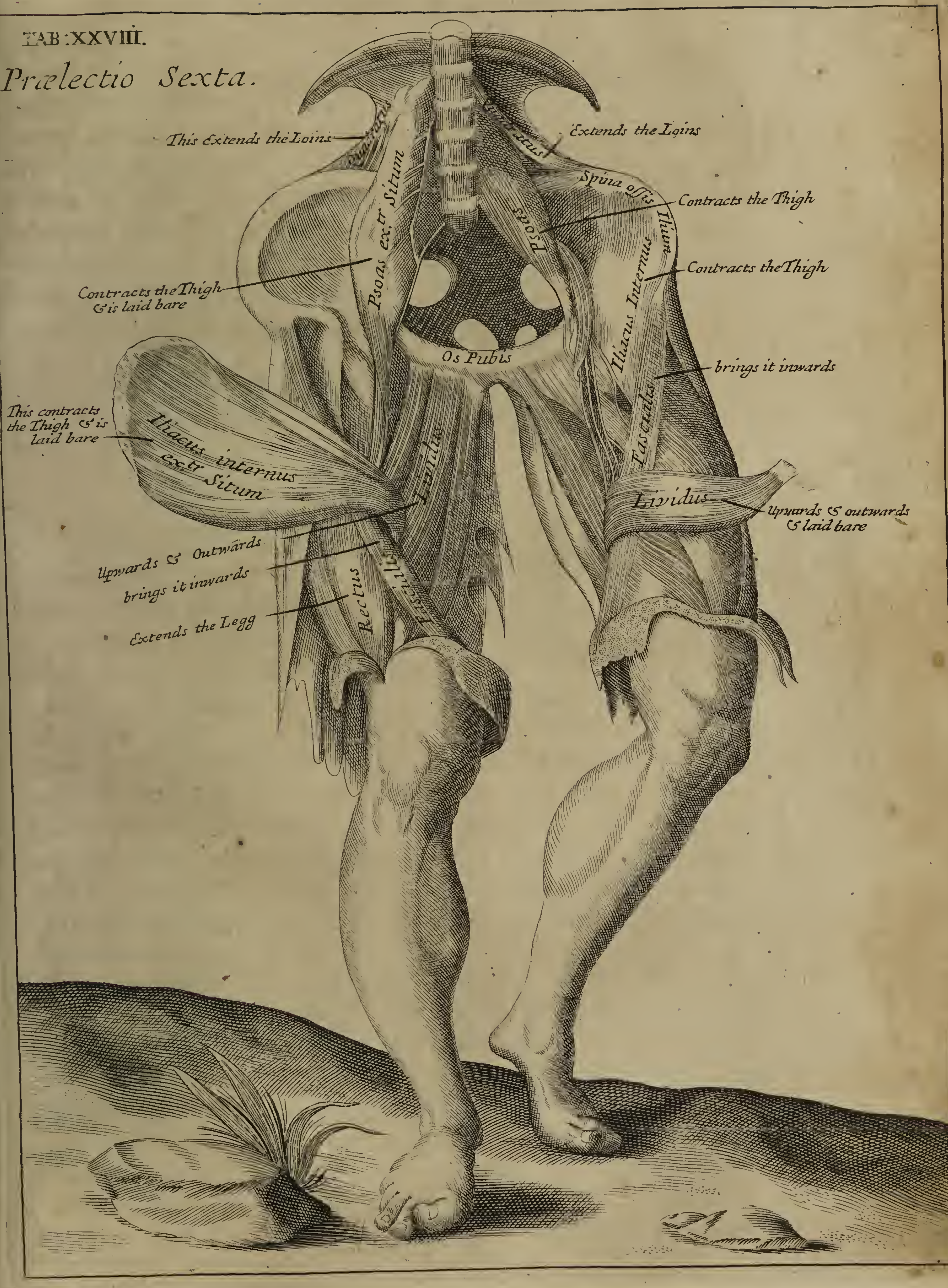
Pſoas Parvus.

This aſſiſts the former.

THIS is not ſeen in all Bodies; whenever you find it, you will meet it ariſing fleſhy from the upper part of the firſt *Vertebres* of the *Loins*, internally within the *Abdomen*: *Bauhine* ſaith, it ariſeth fleſhy the length of a *Little Finger*, and is dilated with

TAB:XXVIII.

Prælectio Sexta.



a ſlender and broad Tendon, above the *Pſoas Magnus*, and ends with the *Pſoas* and *Ileon*, embracing them both very firmly: *Riolan* declares, he could never find this in Women: *Bartholine* writes, that which he found in a Man at the *Hague* had a fleſhy Origination, equalling the breadth of three *tranſverſe Fingers*, and was inſerted fleſhy into the upper and back part of the *Os Ileon*; at the beginning of *Iliacus Internus*, it being made as a Pillow to the former: Mr. *William Molins* in the year he was Maſter of *Anatomy*, ſhewed this *Muſcle* in a Body then diſſected by him, at the *Theatre* in *Chirurgeons Hall.*

This Muſcle laying under the former, is not here ſhewn in Figure.

Iliacus Internus.

This bends the *Thigh* direct

THIS ariſeth with a thin and fleſhy Beginning, in the inner Cavity of the *Os Ileon*, and in its deſcent over it in its lower part, it joyns its ſelf with the former, and is implanted into the ſame *Rotator*, a little below it: This and the former are allowed the *Thighs Elevators*, and by the Benefit of both of them, the *Thighs* are lift up, and brought forwards in Contraction; and whilſt the *Tarſus* of the hinder Foot is ready to land on the Ground, the hinder Foot by wheelingupon the *Metatarſe* and *Toes*, does ſeem to draw the *Trunk* of the *Body* forwards; ſo that the other Limb being extended, the *Centre of Gravitation*, may be turned upon the *Heel* of the Fore Foot, which is the reaſon why we are ſo ſubject to fall in running: Our Bodies being hurryed in a violent Motion, does ſuddenly raiſe the hinder Foot, from the *Tarſe* to the *Metatarſe* and *Toes*; and with that Briskneſs and Violence, that the Fore Foot, upon the leaſt Hindrance or Obſtruction, cannot ſo well, and ſo readily land its ſelf on the ground, or receive the weight of the Body, ſo as to prevent its falling, as Dr. *Collins* well obſerves: Again, as the *Pſoas* is faſtned to the *Vertebres* of the *Back* and *Loins*, and the *Iliacus Internus* to the Surface of the *Os Ileon*, as to the *Centers* of Motion, and both of them are tyed downwards to the leſs *Trochanter*, as a part more eaſily moveable: The *Thigh* is thereupon drawn upwards, by the Contraction and Abbreviation of theſe Muſcles, they lifting up the *Thigh*, by making of this its Flexure, whilſt the oppoſite Motion, or Extention of the *Thigh* is made good by the *Glu-*

tæi; and as the *Pſoas*, and *Iliacus Internus*, do pull the *Thigh* upwards; ſo the *Gracilis*, *Seminervoſus*, *Semimembranoſus*, and *Biceps*, do bring it backwards.

This you have at Tab. XXVII. *both in and out of its place.*

Pectineus, or *Lividus.*

This draws the *Thigh* upwards and outwards.

THIS is ſo called from its ariſing both broad and fleſhy, from the outward part of the *Os Pubis*, or *Pectinis*, or *Share Bone*; and *Lividus* from its Colour, and deſcending obliquely, is inſerted by a flat and ſhort Tendon into the inſide of the *Os Femoris*, on its back part, under its leſſer *Trochanter*, bringing the *Thigh* upwards and outwards: *Bartholine* will have this to be an *Adductor.*

Obſervat.

This Muſcle is an *Aſſiſtant* to *Triceps*, and by bringing the *Thigh* inwards, it proves of great Uſe in Riding, in a great meaſure keeping the Horſeman cloſe to his Saddle; by ſome it is allowed as a part of the *Triceps*, tho' it doth not ſo cloſely adhere to it, but that it may with eaſe be ſeparated from it.

This you have at Tab. *XXVIII. in its place, and at* Tab. *XXXI.*

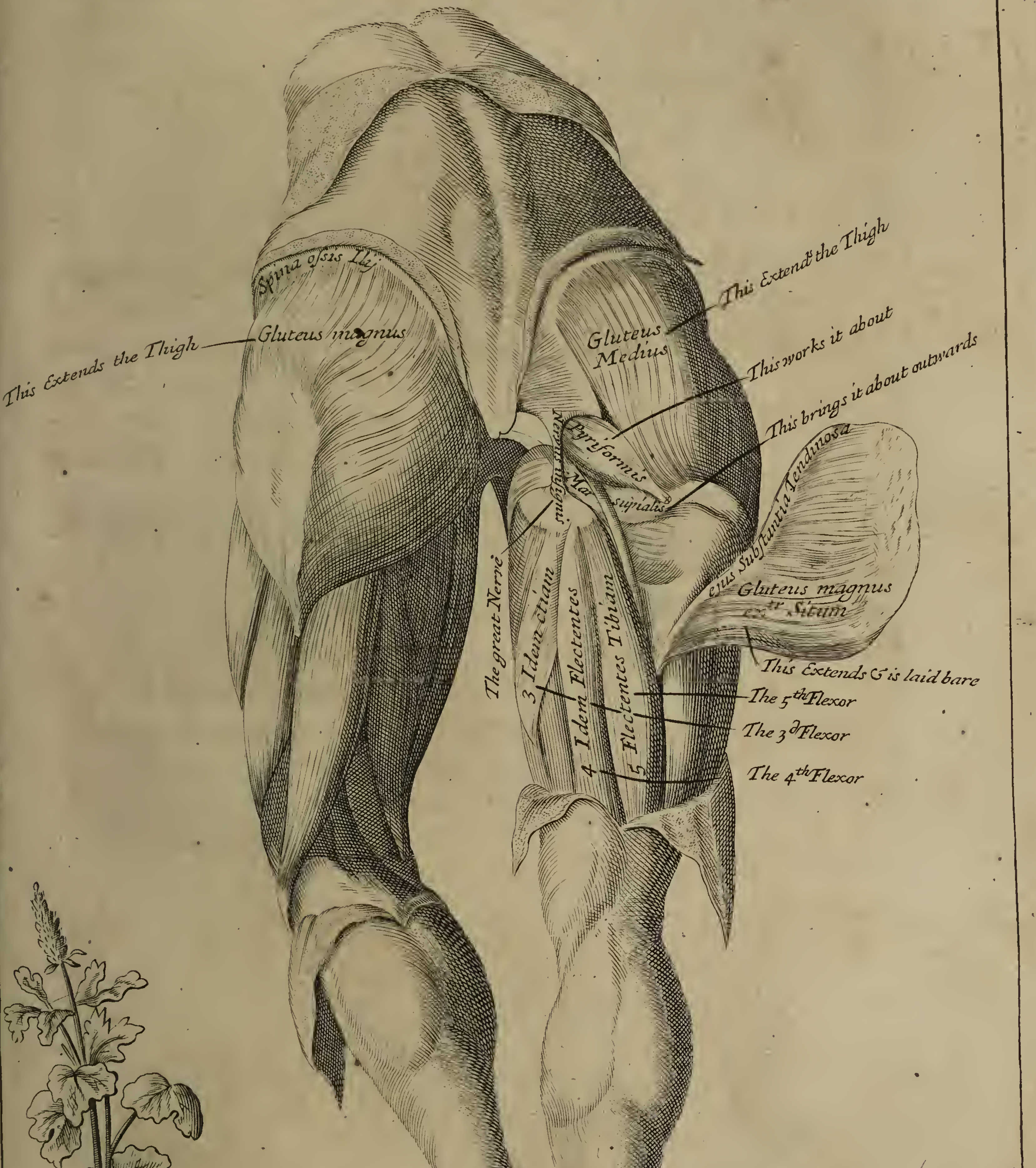
Glutæus Major.

This pulls the *Thigh* directly backwards.

THIS is the firſt and largeſt of the three *Extenſors*, which with the others do make up the fleſhy *Maſs* of the *Buttocks*, whence it has its Name; the *Skin* being laid bare, they all readily ſhew themſelves, and this eſpecially with a broad and ſemicircular Beginning, enated from diverſe Bones, it ariſing tendinous from a great part of the *Spines* of the *Os Ileon* externally, and then thick and fleſhy from the back part of the *Spines* of the *Os Sacrum* laterally; and thirdly from the *Os Coxendix* large and fleſhy, running obliquely downwards over the Juncture of the ſaid Bone; and then growing narrower, is implanted by a ſtrong and broad *Tendon*, into the firſt Impreſſion of the great *Trochanter*, and part of it alſo into the *Linea Aſpera*, on the back part of the *Os Femoris*, beneath the aforeſaid great *Trochanter*, and is ſaid to pull the *Thigh* directly backwards.

Pet.

TAB. XXIX.


Spina ossis Ilij
This Extends the Thigh
Gluteus magnus
Gluteus Medius
This Extend the Thigh
This works it about
This brings it about outwards
Pyriformis
Nervus insignis
Mar supialis
ejus Substantia Tendinosa
Gluteus magnus ex^{tr} Situm
This Extends & is laid bare
The great Nerve
3 Idem etiam
4 Idem Flectentes
5 Flectentes Tibiam
The 5th Flexor
The 3d Flexor
The 4th Flexor

Pet. Borel. in *Obſ.* 86. *Cent.* 2. tells us of one, who being troubled with a large Tumour, and great Pain in his *Thigh*, had many Medicines applyed to him without ſucceſs; which Tumour being opened with the *Actual Cautery*, a plenty of matter was diſcharged thence at the firſt dreſſing, and afterwards ſeveral *Fruſtules* of concreted matter, with little Globes of *Hair*, ſmall *Frogs*, and a *Pea* with its *Shells*, contained in it; all which being removed, the Patient recovered, and his *Ulcer* cicatrized; his Caſe being by ſome ſuppoſed natural, altho' by others thought to be done by *Magick*, or *Witchcraft*.

History.

This you have at Tab. XXIX. *in its place, and laid bare.*

Glutæus Medius.

This aſſiſts the former in Extenſion.

THIS being lodged under the tendinous part of the former *Muſcle*, and being much like it in its Situation and Make, doth ariſe fleſhy from near the whole outward part of the *Spine* of the *Os Ileon*, as alſo broad and ſemicircular, and obliquely deſcending, does narrow its ſelf, enwrapping the Joynt as the former, and is inſerted by a nervous, broad and ſtrong *Tendon*, to the upper and outward part of the great *Trochanter*, drawing the *Thigh* upwards and inwards, as ſome ſuppoſe, whilſt I humbly conceive it doth contract, and aſſiſt the former in depreſſing of the *Os Femoris*.

This you have at Tab XXIX.

Glutæus Minimus.

This extends as the former.

THIS lodging under the former, being leſs than it, as the ſecond is ſmaller than the firſt, doth alſo ariſe like it, both broad, ſemicircular and fleſhy, from the back part of the *Os Ileon*, and is inſerted with a large and ſtrong Tendon, into the upper and inner part of the Root of the great *Trochanter*; this aſſiſting both the former in all their Actions, its Fibres carrying in them the ſame *Series* with thoſe of the former; and I do humbly conceive, they do all agree in pulling the *Os Femoris* downwards and backwards, after it has been raiſed up by the *Pſoas* and *Iliacus Internus*, as I have formerly ſhewn.

Uſe. Theſe three are commonly called the *Cuſhion Muſcles* upon which we ſit, and all of them joyntly aſſiſting each other in extending the *Thigh*; as they are faſtned above either to the *Os Ileon*, *Sacrum*, and *Coccix*, and are inſerted either a little beneath, or into the great *Trochanter* of the *Thigh*, which being leſs ponderous than the *Trunk*, is more eaſily moved, than the other more fixed and heavy Bones; becauſe the *Thigh Bone* playing in a *Socket*, may be eaſily depreſt in Extenſion by the *Glutæi*, which being contracted and abbreviated, do pull the *Thigh* downwards, and cauſe it to be made more ſtreight in progreſſive Motion.

Obſervat.

This you have at Tab. XXXIII. *laid bare.*

Pyriformis, or *Iliacus Externus*.

This works the *Thigh* about.

IT has its firſt Name from its Figure, and *Iliacus Externus* from its ſite; it ariſeth thick, round, and fleſhy from the three lower *Vertebres* of the *Os Sacrum*, and marching obliquely to the great *Sinus* of the *Os Ileon*, is inſerted by a round *Tendon* into the fourth Impreſſion of the great *Trochanter*, bringing the *Thigh* upwards and outwards; and conſidering its bigneſs, it is allowed one of thickeſt *Muſcles* in the *Humane Body*, and is ſtuft up with variety of *Fibres*.

This you have at Tab. *XXIX. and at* Tab. *XXX. it is laid bare, and at* Tab. *XXXIII. you have the ſame again laid bare.*

Obturator Internus, or *Marſupialis*.

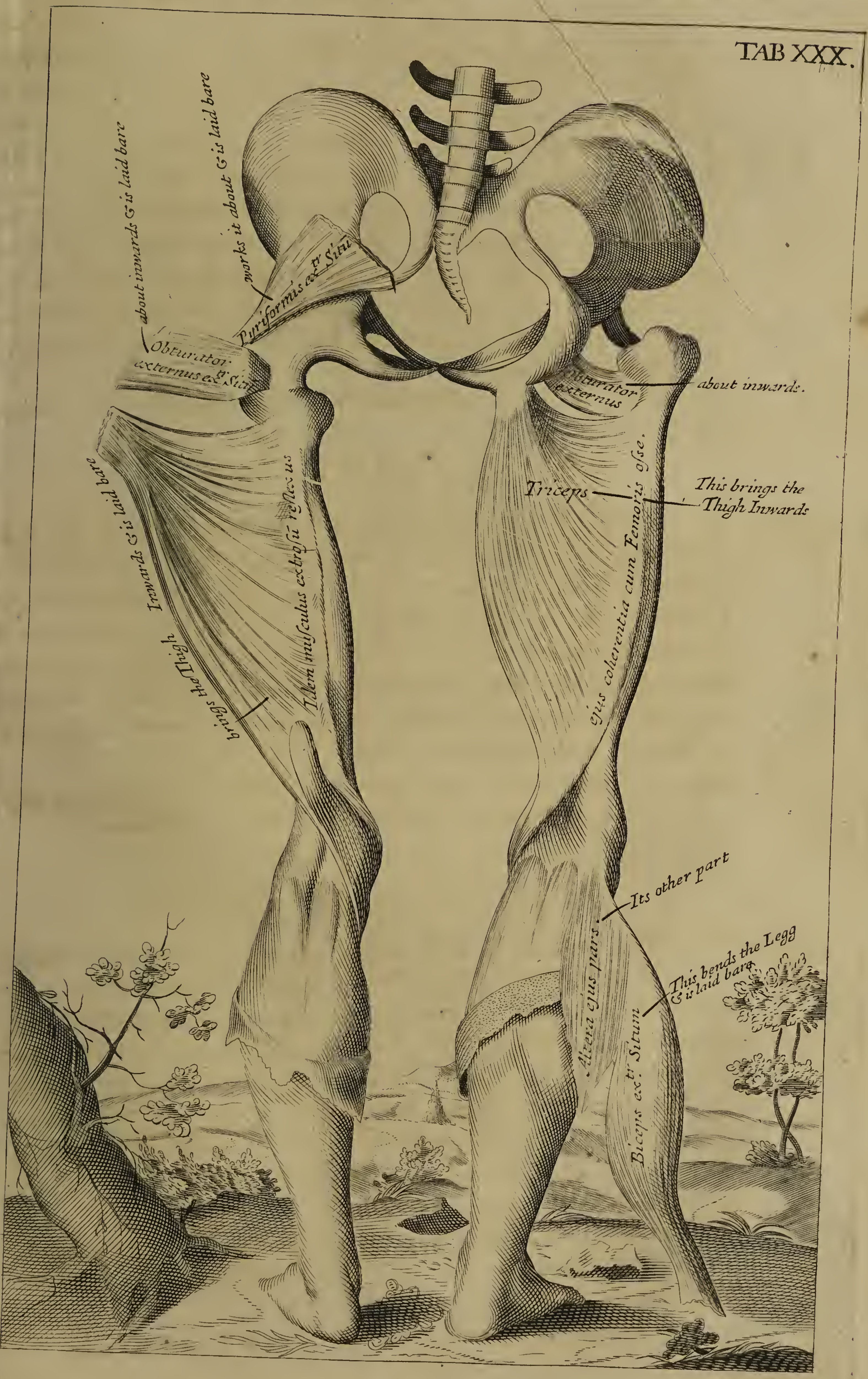
This brings the *Thigh* about *outwards*

THIS ariſeth large and fleſhy, from the Membrane which internally covers the great Perforation of the *Os Pubis*; and covering that Bone, and the *Coxendix*, doth narrow its ſelf, ſending forth three or four Tendons, which are carryed thro' the *Sinus* of the *Coxendix*, which is arched over according to its length with a ſtrong Ligament, backwards to the outward part of the *Coxendix*, where they are received into a fleſhy *Purſe*; and ſo making one *Tendon*, are implanted into the *Sinus* of the great *Trochanter*.

Obſervat. This Muſcle muſt be raiſed inwards, where having got thro' the *Sinus*, under the *Ligament*, you will plainly ſee the *Purſe* ſhew its ſelf.

This is ſhewn at Tab. XXIX. *and at* Tab. XXXIII. *it is laid bare.*

TAB XXX.


works it about & is laid bare
Pyriformis ex^{tr} Situ
about inwards & is laid bare
Obturator externus ex^{tr} Situ
brings the Thigh Inwards & is laid bare
Idem musculus extrorsu reflexus
Obturator externus
about inwards.
Triceps
This brings the Thigh Inwards
ejus coherentia cum Femoris osse.
Its other part
Altera ejus pars
This bends the Legg & is laid bare
Biceps ex^{tr} Situm

Quadratus Femoris.

THIS hath its Name from its Figure, it ariſing broad and fleſhy from the riſing of the *Os Ileon*, and from the *Appendix* of the *Coxendix*, and doth run broad, ſhort and fleſhy towards the back part of the great *Trochanter*, and is inſerted into that *Space* of the Bone, which is between the two *Trochanters*.

This brings the *Thigh* about backwards.

The Head of *Lividus*, and a part of *Triceps* muſt be thrown off, before the beginning of this will be cleared, or the *Obturator Externus* found out. *Veſalius* doth divide this into two Muſcles; this is alſo called *Quadragiminus*, and you may ſee it carries that Name in my Table.

Annotat.

This you have at Tab. XXXIII.

Triceps.

THIS hath its Name from its three Heads, and is the largeſt Muſcle of the *Thigh*, it apparently diſcovering its three Heads or Originations, all which do conclude and terminate in one; its firſt and largeſt Head being partly fleſhy, and partly nervous, ariſing from the *Appendix* of the *Coxendix*; where tumifying, it dilates its ſelf into the back part of the *Thigh*; and then growing ſmall, ends in a ſtrong round *Tendon*, at the inner and lower Head of the *Os Femoris*; the ſecond ariſeth fleſhy from the *Coxendix*, at its Conjunction with the *Os Pubis*, and doth terminate at the Root of the leſſer *Trochanter*, and in the upper part of the *Aſpera Linea* of the *Thigh Bone*; the third ariſeth fleſhy from the lower part of the *Os Coxendix*, and is implanted into the *Linea Alba* of the ſaid *Os Femoris*: This is allowed a riding Muſcle, bringing the *Thighs* inwards, and fixeth the *Rider* to his Seat, and may well enough be called *Muſculus Pudicitiæ*, it being aſſiſted by *Lividus* in keeping the *Legs* cloſe.

This brings the *Thigh* inwards.

I ſhall here inſert an Obſervation, which happed in St. *Thomas's Hoſpital*, in one *Thomas Lowdal*, a Patient of mine once there with a fractured *Thigh*; who being a Servant to a *Carpenter*, and imployed in his *Majeſties* Service at the *Tower*, and be-

Obſervat.

being there at work on the Top of the Houſe, fell thro' the Joice three Stories high, and broke his left Thigh Bone in ſeveral Pieces; for the Cure of which, he was ſent thither by the Right Honourable my Ld. *Lucas*, chief Governour thereof; and being my Taking in week, he became my *Patient*; his Thigh was very much tumefyed, and his Thigh Bone came thro' the Fleſh, he had continual Pain, and Impoſtumations dayly ariſing thence; all which, with good Fomentations, and other warm Dreſſings were ſo much leſned, and ſo far abated, that we endeavoured to reduce the fractured Bone, but could not; it readily flying out again upon our dayly opening him; at length the whole piece of Bone exfoliated the length of three or four Inches at the leaſt, which being removed, with ſeveral ſmall Splints of Bones, which were afterwards diſcharged, his Thigh dayly abated of its Swelling, and a callous reacht down from the upper to the lower part of the Bone; and by keeping it all along well extended, the Callous thickned and hardned, ſo that in about ſix Months time he began to get up, and arrived at greater Strength dayly, and bore upon his *Leg* very well, and when he was diſcharged the Houſe, his fractured *Leg* was not ſeen to be above half an Inch ſhorter than his other.

This you have at Tab. XXX. *in and out of its place, and alſo at* Tab. XXXI. *and at* Tab. XXXII.

Obturator Externus, or *Marſupialis*.

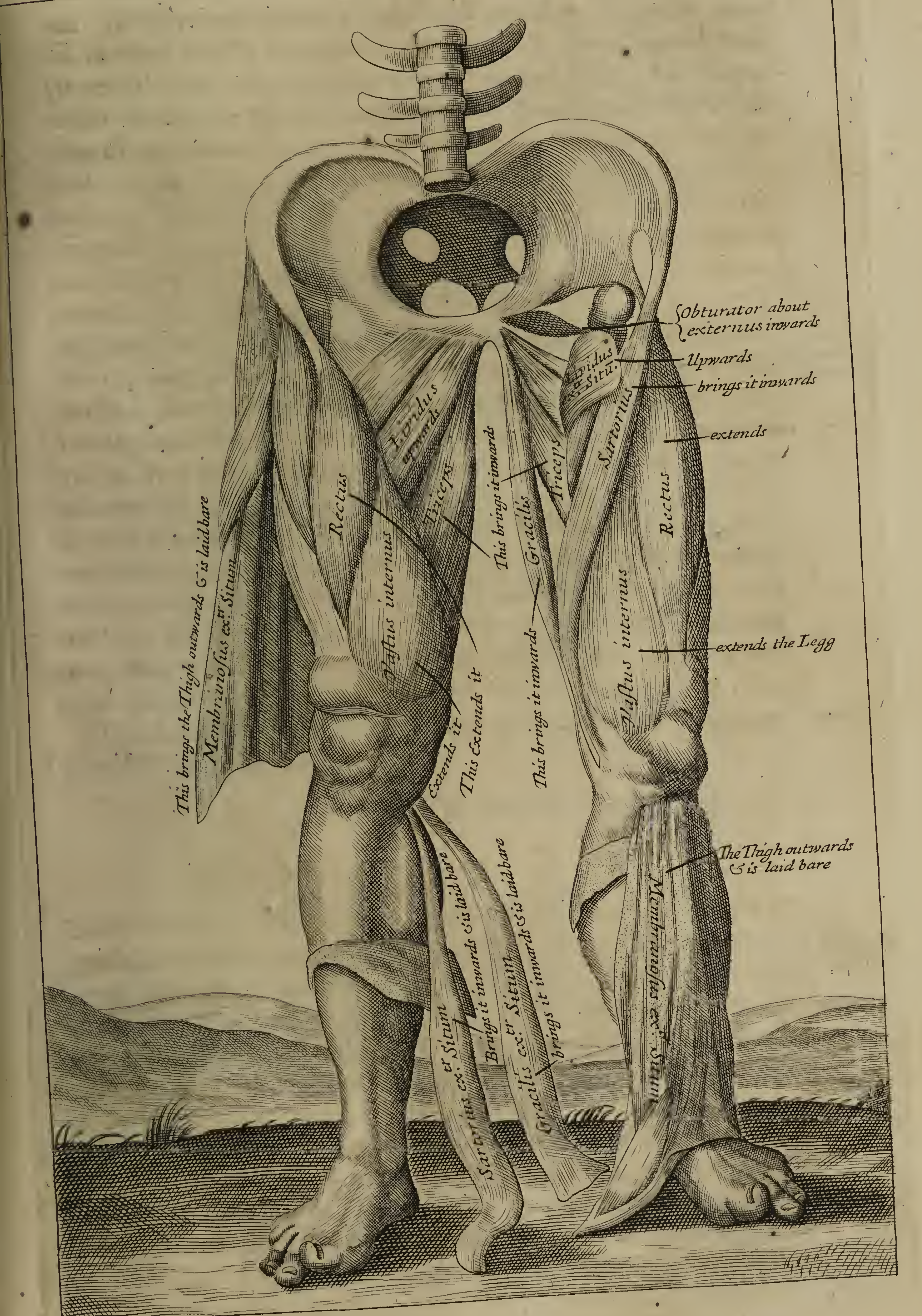
This works the *Thigh* about inwards.

THIS hath its Name from its Situation, it ariſing from the outward part of the Cavity, between the *Os Iſchium*, and the *Os Pubis*, lying under the *Pectinæus*, it ariſing large and fleſhy from the Membrane that enwraps the Perforation of the *Os Pubis* outwards, and then tranſverſely marching to the back part of the Thigh, (becoming narrower) is inſerted by a ſtrong Tendon into the *Sinus* of the great *Trochanter* of the Thigh Bone, near the Termination of the *Triceps*, and and doth turn the Thigh inwards.

Annotat. You muſt carefully bring your Knife inwards about the edge of the *Perforation* of the *Os Pubis*, then this will plainly appear, and ſhew its Origination.

Hiſtory *Marcel. Donat. Hiſt. mirab. Lib.* 4. *Cap.* 30. writes of a Woman, who after her lying in, had a very large Tumour aroſe

TAB. XXXI


Obturator externus about inwards
Lividus ex. Situ. Upwards
brings it inwards
Sartorius
extends
Rectus
Vastus internus
extends the Legg
The Thigh outwards & is laid bare
Membranosus ext. Situm
Triceps
Gracilis
This brings it inwards
Lividus upwards
Rectus
Vastus internus
Triceps
This Extends it
Extends it
This brings it inwards
This brings the Thigh outwards & is laid bare
Membranosus ext. Situm
Sartorius extr. Situm
Brings it inwards & is laid bare
Gracilis extr. Situm
brings it inwards & is laid bare

her Thigh, which dayly encreaſed in bulk; after the Application of diverſe ſuppurative Medicines, the Tumour being opened, out of it was diſcharged a white Stone, the bigneſs of a *Hens Egg*, which being removed thence, the *Patient* ſoon recovered, *&c.*

This you have at Tab. XXX, XXXI, XXXII, *and* XXXIII.

Membranoſus.

This brings the *Thigh* and *Leg* outwards.

THIS hath its Name from its membranous Expanſion, it ariſing ſharp and fleſhy from the upper *Spine* of the *Os Ileon*, to that ſide near *Sartorius*, where it turneth into a very long and broad Tendon, not much unlike the *tranſverſe Ligament*; and is therefore called by ſome *Faſcia lata*, it almoſt enwrapping all the *Muſcles* of the *Thigh* in it, and not only ſo, but thoſe of the *Patella* and *Focils*, in their outward parts, and then doth joyn its ſelf with the *Ligamentum Annulare*, which keeps in the Tendons of the *Toes* and *Feet*, as ſome will have it, whilſt others as readily ſay, that this *Faſcia lata* goes no farther than the lower part of the *Thigh Bone*, or the upper parts of the *Focils*.

Annotat.

This Muſcle doth aſſiſt the *Legs* in extending, by bringing them forwards and outwards.

This you have at Tab. XXXI.

Sartorius, or *Faſcialis.*

This brings it inwards.

IT hath its firſt Name from its uſe, and the other from its croſſing the *Thigh* like a *Swathing Band*, in keeping the reſt of the Muſcles aright in their places; it ariſeth with a ſharp and fleſhy Beginning from the fore part of the *Spine* of the *Os Ileon*, near the former Muſcle, and running obliquely inwards over the Muſcles of the *Thigh*, it becomes tendinous in its Paſſage over the inner and lower Head of the *Os Femoris*, and is inſerted by a broad Tendon, (as ſome Authors affirm) and round, (as others write) below the upper Head of the *Tibia*: *Riolane* writes, that this brings the *Leg* inwards, and therefore thinks, that it rather extends it.

This you have at Tab. XXVIII. *&* *at* Tab. XXXI. *in and out of its place.*

Gracilis.

This aſſiſts the former.

THIS has its Name from its Make and Shape, it being a very ſlender *Muſcle*, lying next the former; it ariſing partly nervous, and partly fleſhy from the middle of the *Os Pubis* internally, between the firſt and ſecond Heads of the *Triceps*, and growing narrower in its ſtreight deſcent, in the inſide of the *Thigh*, doth then become a round *Tendon*, at the inner Head of the *Os Femoris*, it inſerting its ſelf into the *Tibia* next the former; this aſſiſting it in its Contraction, and bringing the *Thigh* and *Leg* inwards.

This you have at Tab. XXXI. *both in and out of its place.*

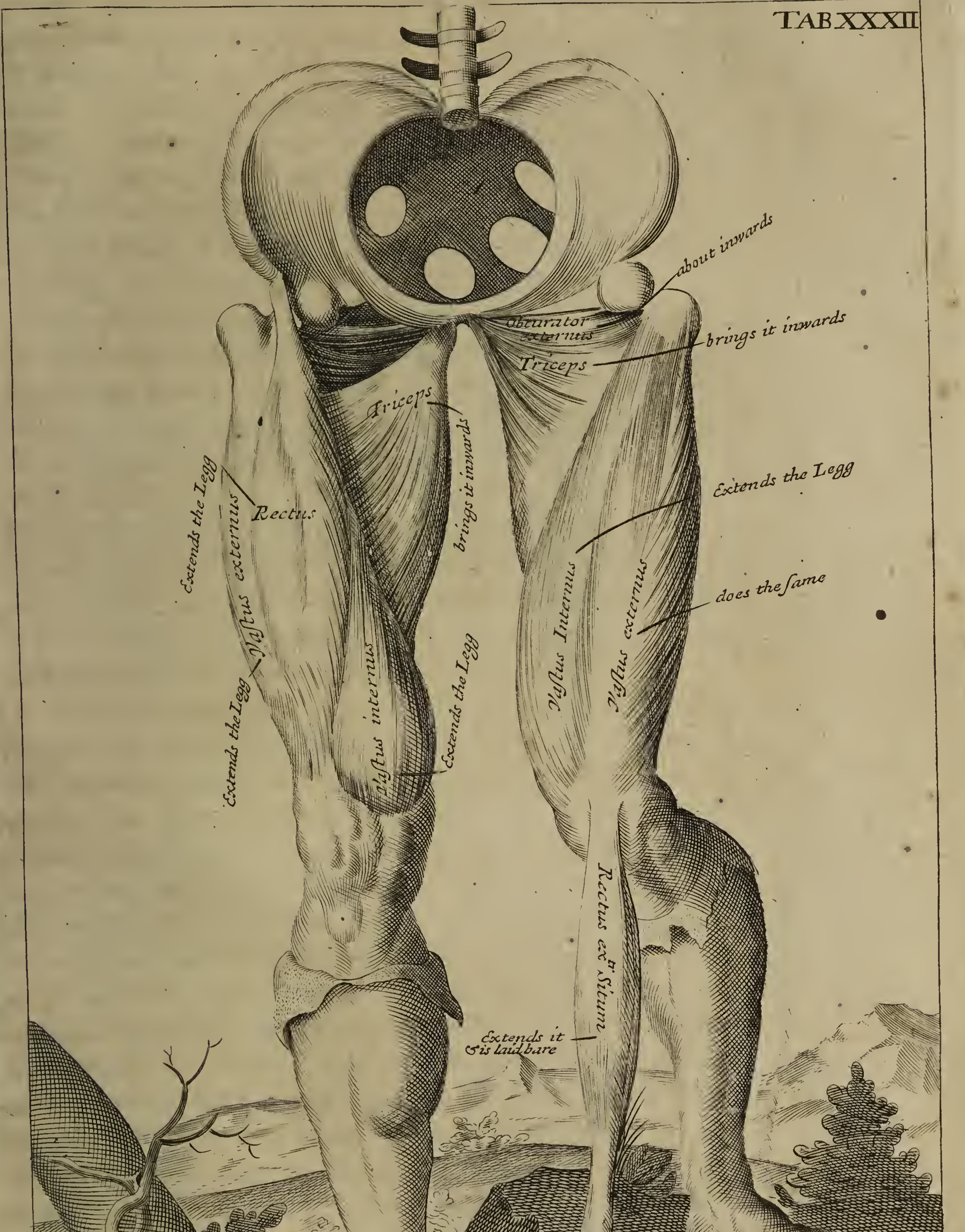
Seminervoſus.

This bends the *Tibia* backwards.

AT the outſide of the *Thigh Bone* at its Head, ariſeth a *Ligament*; which binds both the *Thigh* and the *Leg* together; and in the *Tibia*, as well as in the *Cubite*, *Nature* hath planted two Bones, which by us *Surgeons* are commonly called *Focils*, or *Tibia*, and *Fibula*; the *Tibia* being inwardly hollowed, hath an *Appendix* at either end, the upper being larger than the lower, and furniſhed with a *Prominence* parting the two *Sinus's*, which are well guarded with a cartilaginous *Margent*, cauſing the *Sockets* to have a deeper Impreſſion, for the more firm Articulation of the *Knee*; the inner *Appendix* being much leſs than the former, and allowed a *Protuberance* growing on the inſide of that Bone, which we generally call the inner *Ancle Bone.*

The *Fibula* does not climb ſo high as the top of the *Tibia*, but hath allowed it its proper *Appendix*, which has a *Sinus* inſculpt in its inſide, into which a ſmall Protuberance is receiv'd. And to the Fore-part of the *Knee*, a round Bone is affixt, commonly called the *Patella*, or *Knee-pan*, which is not tyed to it by any *Ligament*, but only ſtrongly faſtned thereto, by the Tendons of Muſcles paſſing over the Joynt of the *Knee*, from the *Thigh Bone*: Having giving this ſhort Account of the Bones belonging to the *Leg*, we now come to treat of its Muſcles: One of which, is this we are now deſcribing, which takes its

TAB XXXII


about inwards
Obturator externus
brings it inwards
Triceps
Triceps
brings it inwards
Extends the Legg
Rectus
Vaſtus externus
Extends the Legg
Vaſtus internus
Extends the Legg
Extends the Legg
Vaſtus Internus
Vaſtus externus
does the ſame
Rectus ex^{tr} Situm
Extends it
& is laid bare

Name from its *Subſtance*, being allowed either nervous or membranous, or if you pleaſe, partly nervous, and partly fleſhy; it ariſing ſmall and nervous from the ſame *Appendix* as the former, and then continuing ſo half way in its deſcent, grows fleſhy, running by the back part of the *Os Femoris*, to the *Ham*, near which it becomes a round Tendon, and reflecting its ſelf, is inſerted into the Fore-part of the *Tibia*.

Obſervat. The three Tendons of theſe three Muſcles, and theſe following, do make up the inward *Ham-ſtrings*.

Hiſtory. I ſhall here inſert the other Obſervation of *Monſieur de Blegny*, as you have it under his own Hand; of a poor man who came to be my Patient in St. *Thomas's* Hoſpital, whoſe left *Ham* was ſo contracted, that for near twenty years he could not bring it down lower than his other *Knee*, and yet I cured him ſo well, that for ſome years he became my *Skillet Carrier* in the Hoſpital, and ſince which I underſtand he ſets up for a *Country Practitioner*, walking as ſtreight with that *Leg* as with his other; altho' when I firſt ſaw him he had a *Cancerous Excreſcence* that reached from above the *Calf* of his *Leg*, and preſt on the great Tendon of the *Gaſterocnemius* even to his *Heel*.

Je vis par occaſion au meſme lieu un fort grand Ulcere a La Jambe gauche d'un homme partie poſterieure & inferieure, que Mr. Browne *me dit avoir ſuccedé a L'amputation d'une excroiſance charnue de la groſſeur de deux poigns qui contragnoit auparavant de telle ſorte le Tendon d'Achilles que le malade portoit toujours ſa jambe en L'air a la hauteur du genovil oppoſé: Mais, les Cauſtiques, les Catheretiques, les ſuppuratifs, & les Mondificatifs que* Mr. Browne *avoit mis en Uſage depuis environ une Mois avoint tellement diſſipé la Tumeur & de chargé la partie, que Malade pouvoit alors Mettre ſon pied à terre avec aſſes de facilité pour faire prejuger qu'ill pourroit ſ'appuyer d'eſſus apres la Cicatriſation de L'ulcere, dans le fond du quel on ne voy oit plus de chair fongeuſe; Lors que la Chyrurgie eſt pratiqué de la ſorte, elle eſt un grand Ornament dans L'art de guerir.* Thus tranſlated,

I ſaw by accident in the ſame place a very large Ulcer, on the left Leg of a Man, coming from behind the *Calf* thereof, reaching down near to the *Heel*, which Mr. *Browne* told me did ariſe from a *Cancerous Excreſcence*, the bigneſs of two *Fiſts*, which did preſs ſo hard upon the great Tendon, that the *Patient* was forced to carry his *Leg* as high as his right *Knee*, but by the *Cauſticks*, *actual Cauteries*, *ſuppurating* and *mundifying Medicines*, which Mr. *Browne* had uſed for near a Month, he had ſo diſperſt the Tumour, and ſo diſcharged the *Fungus*, that the

Patient could ſet his *Foot* upon the Ground with great eaſe, that we could eaſily foreſee he would ſpeedily ſtand upon it, the *Ulcer* being cicatrized, and the *Fungus* being diſcharged: When *Surgery* is practiſed in this manner, it is a great Ornament to the Art of Healing.

This you have at Tab. XXIX. *by the Name of the third* Flexor. *and at* Tab. XXXIII. *both in and out of its place.*

Semimembranoſus.

This Contracts the *Leg.*

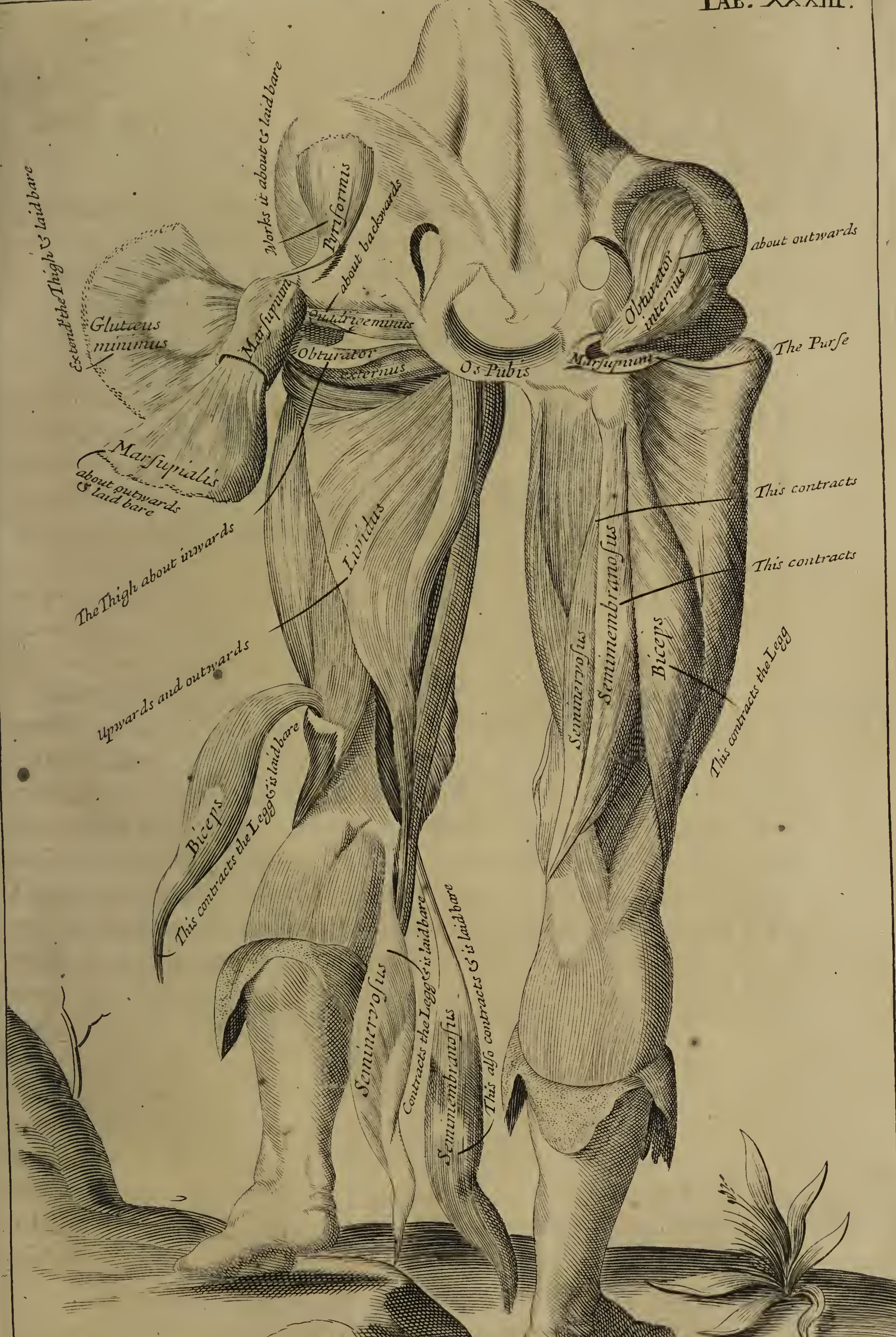
THIS hath its Name from its membrane-like Subſtance laying juſt under the former, it ariſing broad and membranous with it, and running downwards from the *Protuberance* of the *Os Iſchium*, where growing broader, doth ſtill continue membranous near half its Progreſs, and after growing fleſhy, and thick, and then getting under the round Tendon of the former, does afterwards make a ſhort and thick Tendon, which inſerts its ſelf into the inſide of the *Tibia*; the fleſhy Belly of the former Muſcle lodging above, and this juſt lying underneath, have their Tendons quite contrarily diſtributed and diſpoſed.

Hiſtory.

I ſhall here relate another Caſe of a *Patient* of mine, when I belonged to St. *Thomas's Hoſpital*, which is as followeth: One *Peter Palſey*, a very able *Seaman*, being at the round top of the *Ship*, unhappily fell from thence into the *Hold*, and fractured his left Leg all in pieces, and being ſent to St. *Thomas's Hoſpital*, he was my *Patient* there, out of whoſe *broken* Leg, I took near forty ſplints of *Bones*, at ſeveral times, and beſides theſe, there came out thence a very large piece of the *Major Focil* equalling a *Hands* breadth; he having a continual pain on him, this occaſioned a ſymptomatick Fever, which waſted him to that degree, that many times he deſpaired of recovery, all which being abated by the Dr. of the ſaid Hoſpital, and afterwards by *vulnerary Decoctions*, and other convenient Drinks inwardly taken, and proper outward Medicines being applyed to him, I at length made him ſo well, that no one could by the Frame of his *Leg*, ſee, which had been fractured; for which Cure I had the particular Thanks of the Governours then attending.

This you have at Tab. XXIX. *as the fourth* Flexor, *and at* Tab. *XXXIII. you have the ſame both in and out of its place.*

TAB. XXXIII.


Extend the Thigh & laid bare
Gluteus minimus
Works it about & laid bare
Pyriformis
about backwards
Marſupium
Quadrigeminus
Obturator externus
Marſupialis
about outwards & laid bare
The Thigh about inwards
Lividus
Upwards and outwards
Os Pubis
Obturator internus
about outwards
Marſupium
The Purſe
This contracts
This contracts
Seminervoſus
Semimembranoſus
Biceps
This contracts the Legg
Biceps
This contracts the Legg & is laid bare
Seminervoſus
Contracts the Legg & is laid bare
Semimembranoſus
This alſo contracts & is laid bare

Biceps Femoris.

THIS hath its Name from its two *Heads*, or Originations; it ariſing ſharp, and nervous from the ſame *Appendix* as the two former; and then growing fleſhy and large in its march externally downwards, and having got near half its progreſs, is ſeen to narrow its ſelf; and joyning with the other Head, which ariſeth from the *Linea Aſpera* of the *Os Femoris*, where the *Glutæus Major* hath its Inſertion, and growing thicker, tho' outwardly *Tendinous*, as it marcheth in a *Channel* in the outward *Appendix* of the *Os Femoris*, it firmly ties its ſelf to the outſide of the upper *Appendix* of the *Fibula*, with its tendinous Inſertion.

This Contracts the *Leg*.

This you have at Tab. *XXIX. as the fifth* Flexor, *and at* Tab. *XXX. it is laid bare, and at* Tab. *XXXI, and* Tab. *XXXIII. its ſhewn both in and out of its place.*

Rectus Femoris.

IT hath its Name from its ſtreight Progreſs, and carries in it the true Figure of a *Muſcle*, it ariſing fleſhy from the lower *Spine* of the *Os Ileon*, and running along the length of the *Thigh*, with its thin and fleſhy Belly, it wholly becomes *Tendinous*, before it reacheth the *Patella*, where it expands its ſelf into a ſtrong broad *Tendon*, entirely covering the ſaid *Patella*; and being joyned with the Tendons of *Vaſtus Externus*, and *Vaſtus Internus*, is inſerted with them to the upper part of the *Tibia*, at a prominence there provided for its Reception.

This extends the *Leg*.

This you have at Tab. *XXIX.* Tab. *XXXI; XXXII. both in and out of its place.*

Vaſtus Externus.

THIS takes its Name from its great *Maſs* of Fleſh, it ariſing outwardly nervous, and inwardly fleſhy from the outward part of the great *Trochanter*, and joyning himſelf to the outward, and upper part of the *Os Femoris*, and deſcending fleſhy to the *Patella*, it next becomes a membranous and broad *Tendon*; and mixing it ſelf with the *Tendon* of *Rectus*; does

This extends the *Leg*.

does farther promote the making a ſtronger Covering for the *Patella*, it carrying the ſame Inſertion with it.

This you have at Tab. XXXI, XXXII. *in its place.*

Vaſtus Internus.

This works as the former.

THIS hath the ſame denomination with the former from its largeneſs, it having a vaſt Beginning, partly nervous, and partly fleſhy, it ariſing tendinous from part of the leſſer *Trochanter*, and from the Neck of the *Os Femoris*; then growing fleſhy, it joyns to the fore and inner part of the ſaid Bone, and recovering the *Patella*, mixeth its *Tendon* with that of the *Rectus*, and the former *Vaſtus*, covering it, and having the ſame Inſertion with them.

The ſecond *Model* of the fore Limb, in order to progreſſive Motion, is tranſacted by the joynt Tenſion of all the parts of the *Limb*; the *Thigh* being extended by the *Contraction* of the *Glutæi*; and the *Leg* at the ſame time being brought forwards, by the Motion of *Membranoſus*, *Rectus*, *Vaſtus Externus*, *Vaſtus Internus*, in which the *Foot* is brought to an accute Angle with the *Leg*, and to an *Obtuſe* one with the *Foot*.

This you have at Tab. XXXI, XXXII.

Suppoplitæus.

This brings the *Leg* obliquely.

THIS ariſeth with a ſhort and ſtrong *Tendon*, from the lower and outward *Extuberance* of the *Os Femoris*, and obliquely marching over its Juncture, does become fleſhy; then extending its ſelf, is inſerted into the upper part of the *Tibia*, in its inſide a little beneath its upper *Appendix*, and doth aſſiſt the former *Flexors* in contracting the *Thigh*.

This you have at Tab. *XXXI*, *XXXII*. *in their places.*

Gaſterocnemius Externus, or *Gemellus.*

is extends
e *Foot.*

THE *Foot* is allowed to be ὄργανον τοῦ βαδίζειν, or *Inſtrumentum Ambulatorium*; and as Man, who is granted the wiſeſt of all Creatures, has *Hands* given him as his chiefeſt of Organs to

work

TAB XXXIIII

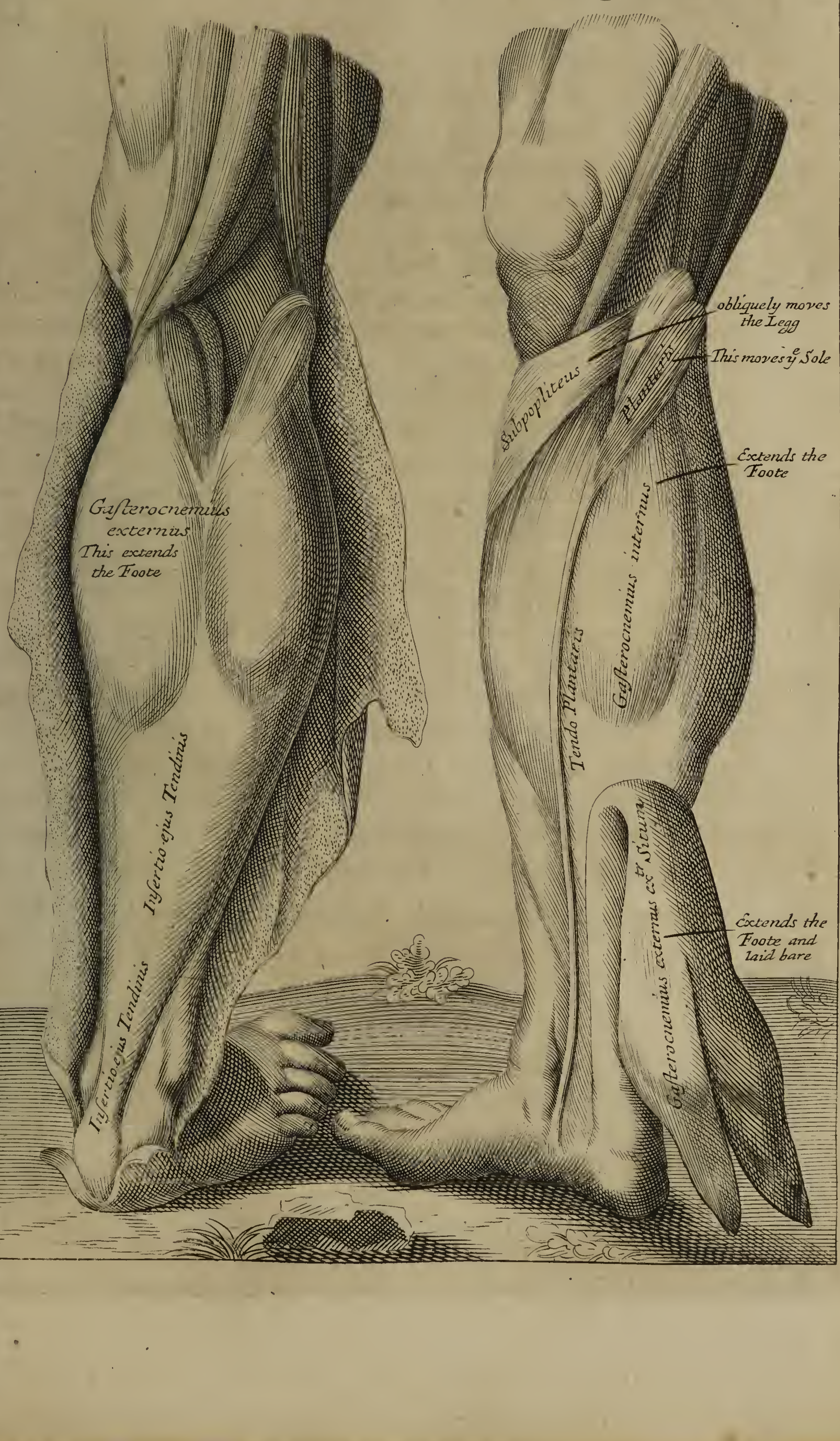


Fig: I.
Fig: II.
Gaſterocnemius externus
This extends the Foote
Inſertio ejus Tendinis
Inſertio ejus Tendinis
obliquely moves the Legg
Subpopliteus
Plantaris
This moves yᵉ Sole
Extends the Foote
Gaſterocnemius internus
Tendo Plantaris
Gaſterocnemius externus exᵗʳ Situm
Extends the Foote and laid bare

work with, ſo has he given him alſo two *Feet* to walk upright, and view the ſpangling Heavens, and admire the wonderful Works of his Great Creator in thus wonderfully framing him.

This has its firſt Name from the Greek Word *Gaſter*, or *Belly*, and by ſome it is called *Sura*, *quaſi conſuit Tibiam Femori*, by ſome called the *Calf* of the *Leg*, which no other *Creature* but *Man* hath the like *Maſs* of *Fleſh* allowed it, on the back part of its *Leg*, and *Gemellus* from its double Origination: The *Foot* we generally allow to be made of a *Tarſe*, *Metatarſe* and *Toes*, and the *Tarſe* has 7 *Bones* allow'd it, as the *Aſtragalus*, *Naviculare*, *Os Calcis*, *Os Cubeiforme*, and the other generally called either *Innominata*, or *Cuneiformia*, from their Figure: The back part of the *Talus* is hollowed, we ſee, for the reception of the *Tendons* of the *Muſcles*; and the *Metatarſe* being made of five Bones, are ſeparated each from other, to make room for the *Interoſſeal Muſcles*; this Muſcle ariſeth broad and fleſhy, from the inner Head of the *Os Femoris*, having a different Set of Fibres allowed it, as alſo from the outward Head of the ſame *Bone*, and by ſome is taken for two proper *Muſcles*, having in their deſcent, two large fleſhy Bellies; then marching towards its Inſertions, are joyned to each other about the mid-way, where they become one entire ſtrong and nervous *Tendon*; and upon narrowing its ſelf, doth intermix its ſelf with the *Tendon* of *Gaſterocnemius Internus* above its Inſertion into the *Os Calcis*, making one ſtrong *Muſcle* with a double Origination: *Riolan* ſaith, that there are two *Seſamoidal Bones* found at the two beginnings of this Muſcle, this being not only allowed an *Extenſor* of the *Foot*, but is very aſſiſting in pulling it backwards.

This is ſhewn at Tab. XXXIV. Fig. II. *laid bare with both its Heads.*

Plantaris.

This moves the *Skin* of the *Sole* of the Foot.

THIS takes its Name from its expanded *Tendon*, which it ſends into the Sole of the *Foot*, it ariſing fleſhy, round and ſlender under the former, from the upper and back part of the lower *Appendix* of the *Os Femoris*, and then obliquely deſcending between both the *Gaſterocnemii*, it becomes a ſtrong flat *Tendon*, and paſſing along between theſe their fleſhy Bellies, by their broad *Tendons*, does run over the *Os Calcis*, and ſtretcheth its ſelf over the *Sole* of the *Foot*, firmly adjoyning to the fleſhy part of the *Perforatus*, and is afterwards inſerted on both ſides, to the firſt *Internodes* of the *Toes*.

Uſe. This Muſcle is allowed the ſame Service to the *Foot*, as *Palmaris* is to the Hand, in extending it.

Gemma Coſmogrit, *Cap*. 8. writes, that he ſaw in the ſpace of three Hours time, a Mortification, which had marched from one great *Toe* of the *Foot* up to the *Belly* and *Bowels*.

This you have at Tab. *XXXIV*. Fig. *II*. *and at* Tab. *XXXVI*. Fig. *II*. *it is laid bare*.

Gaſterocnemius Internus, or *Soleus*.

This extends the *Foot*. THIS is implanted under the two former Muſcles, and hath the Name of *Soleus*, from the likeneſs it hath with a *Sole-Fiſh*; it ariſeth from the upper and back *Commiſſures* of the *Tibia* and *Fibula*, being livid, ſtrong and nervous, from the backward *Appendix* of the *Fibula*, and growing larger and more fleſhy, it joyns its ſelf to that and the *Tibia*, and deſcending near half its progreſs, doth narrow its ſelf, and becomes tendinous, making one with the *Gaſterocnemii Externi*, both in its Origination and Inſertion.

Annotat. Theſe three Muſcles are all united in their *Terminations*, forming one very ſtrong *Tendon*, implanted into the back part of the *Os Calcis*, which by reaſon of its largeneſs, and ſingular Strength, above the *Tendons* of other Muſcles, does gain the Name of *Chorda magna*, which being bruiſed and wounded, (as *Hippocrates* writes) proves very dangerous, if not mortal, and this part alſo being any wiſe inflamed, ſoon runs into Mortification.

Uſe. Theſe three *Muſcles* contracting themſelves, do relax the *Tibialis*, and *Peronæus Secundus*, when they have drawn the *Foot* upwards, and do alſo extend the *Tarſus*, by reducing it to a ſtreight Poſition, making then direct *Angles* with the *Leg*.

Hiſtory. Altho' *Hippocrates* tells us, that wounds here hapning, proves very dangerous if not mortal; to prove the contrary, I had a Patient not long ſince, ſome few miles diſtant from *London*, who fracturing his *Leg* by a fall from his Horſe, near the Joynt; when I came to him, he had ſeveral Mortifications on the parts, but one more particularly ariſing on the great Tendon, which I removed by the help of *Eſcaroticks*,

TAB XXXV

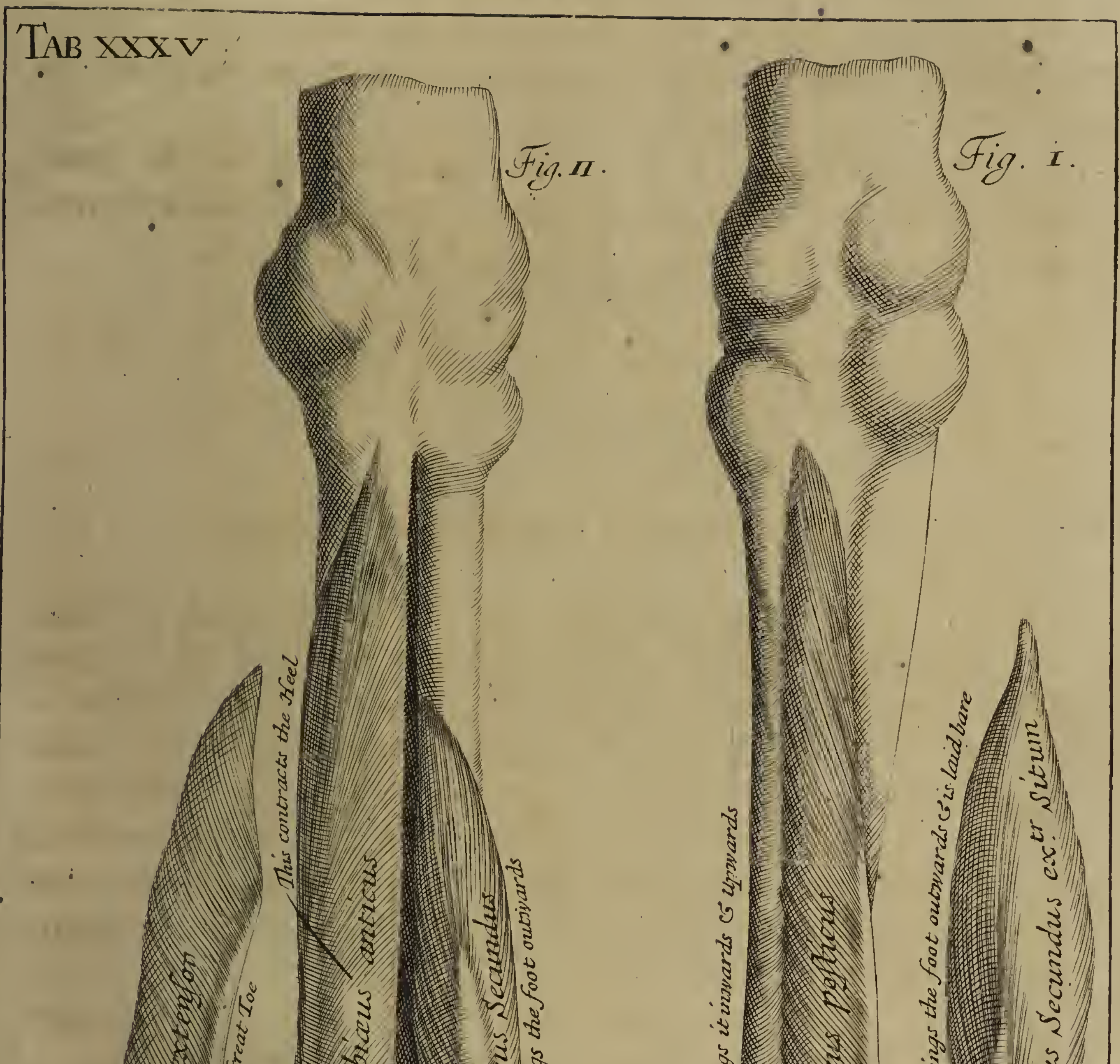


Fig. II.
Fig. I.
Pollicis extensor
This extends ye Great Toe & is laid bare
This contracts the Heel
Tibiaeus anticus
Peroneus Secundus
This brings the foot outwards
This extend' the 2d joint
Extensor 2di digitoru Internodij
This extends ye 3d joint & is laid bare
This draws it from ye rest
Extensor 3tij digitorum Internodij
This brings it inwards & upwards
Tibieus posticus
This brings the foot outwards & is laid bare
Peroneus Secundus extr situm
Two Interosseall
This brings ye small to ye great Toe
This draws ye great Toe out & is laid bare
Abductor
Duo Interossi
Transversalis
Pollicis abductor

by the Application of which, the Gentleman became freed of them, and was afterwards relieved as to his Fracture, and walks now very well with it, his *Leg* being ſomewhat ſhorter than the other, which was occaſioned by the former Surgeons neglect, in not keeping it extended, and in a good Poſture, while the Bone was a knitting, as I told him, when I firſt ſaw it.

This you have at Tab. *XXXIV.* Fig. *II. and at* Tab. *XXXVI.* Fig. *I, II.*

Tibialis Anticus.

This bends the *Heel.*

THIS hath its Name from its Situation, it ariſing ſharp and fleſhy from the upper *Appendix* of both the *Focils*, and cloſely adhering to the ſides of the *Tibia*, and to the *Ligaments* which binds them together; then being dilated, grows narrower about the middle of the *Tibia*, where it makes a ſtrong and round Tendon, which runs obliquely over the ſaid *Tibia*, and under the Ligament of the *Foot*; and is implanted into that inſide of the *Os Tarſi*, that is before the *Os Pollicis*; and ſometimes under the ſame Ligament of the Foot, being divided into two Tendons, one of which is inſerted into the *Os Primum Innominatum*, the other inro the aforeſaid Bone of the *Os Pollicis* of the *Metatarſe*.

Uſe.

This Muſcle, as I do conceive, governs the Foot in its Motion, in keeping it from ſquailing too much outwards.

Hiſtory.

Valleriola, *Lib.* 3. *Enar.* 8. writes of one receiving a ſlight Wound in her *Heel*, who dyed within 17 days after it.

This you have at Tab. *XXXV.* Fig. *II. and at* Tab. *XXXVII.* Fig. *I.*

Peronæus Primus.

This brings the Foot outwards.

THIS *Muſcle* doth ariſe nervous outwardly, and inwardly fleſhy, from near the upper *Appendix* of the *Fibula*, and in its deſcent, doth adjoyn its ſelf to its outward part, being outwardly round, and inwardly livid, and red next to the *Bone*, and having marched near half its Progreſs, it becomes a ſtrong flat *Tendon*, running obliquely backwards thro' the *Sinus* under the outer *Malleolus*, and is inſerted into the Root of the *Os Metatarſi* of the great *Toe*.

This *Muſcle* draweth the *Foot* ſomewhat outwards, and alſo governs it in progreſſive Motion, keeping it from being thrown too much inwards.

This you have at Tab. XXVII. Fig. I, II. *it is laid bare.*

Peroneus Secundus.

This aſſiſts the former.

THIS by ſome is called *Semifibulæus*, and *Peronæus à Perone Fibula*, or the *Minor Focil*, it ariſing long and fleſhy about the middle of the outward part of the *Fibula*, under the former, and having made half its Progreſs, it becomes tendinous, as it runs under the *Malleolus Externus*, and is implanted with its *Tendon*, and the *Tendon* of the former, into the *Os Metatarſi* of the little *Toe*, and ſerves to bring the *Foot* and *Toes* outwards.

Annotat.

And as the *Tibialis Anticus* and this Muſcle contracting themſelves, do raiſe up the *Tarſus* from the Ground in progreſſive Motion, ſo the *Gaſterocnemii* and *Plantaris* are ſaid to relax the ſame alſo in their Contractions.

This you have at Tab. XXXV. Fig. I, II. *and at* Tab. XXXVII. Fig. I.

Tibiæus Poſticus, or *Nauticus.*

This brings the Foot inwards and upwards.

IT hath its Name from its Situation, it being planted backwards, as alſo the Name of *Nauticus*, from the Uſe that *Saylors* make of it, in climbing the *Shrowds*; this ariſeth partly nervous, and partly fleſhy, from the upper and back part of the *Fibula*, as alſo near the *Tibia*; and having paſt near half its progreſs, it narrows its ſelf; and then growing fleſhy again, is afterwards converted into a ſtrong and round *Tendon*, which marcheth in a *Sinus* on the back part of the lower *Appendix* of the *Malleolus Internus*; where being bound by a ſtrong Ligament, overſpreading it, and recovering the *Sole* of the *Foot*, is inſerted into the lower part of the *Os Metatarſi*, which joyns its ſelf to the *Os Cubeiforme*; and ſometimes it hath been ſeen to afford two *Tendons*, one of which hath been implanted into the *Os Naviculare*, and the other into *Os Innominatum*.

This is ſhewn at Tab. XXXVI. Fig. I, II. *and at* Tab. XXXVII. Fig. II.

Exten-

TAB. XXXVI.

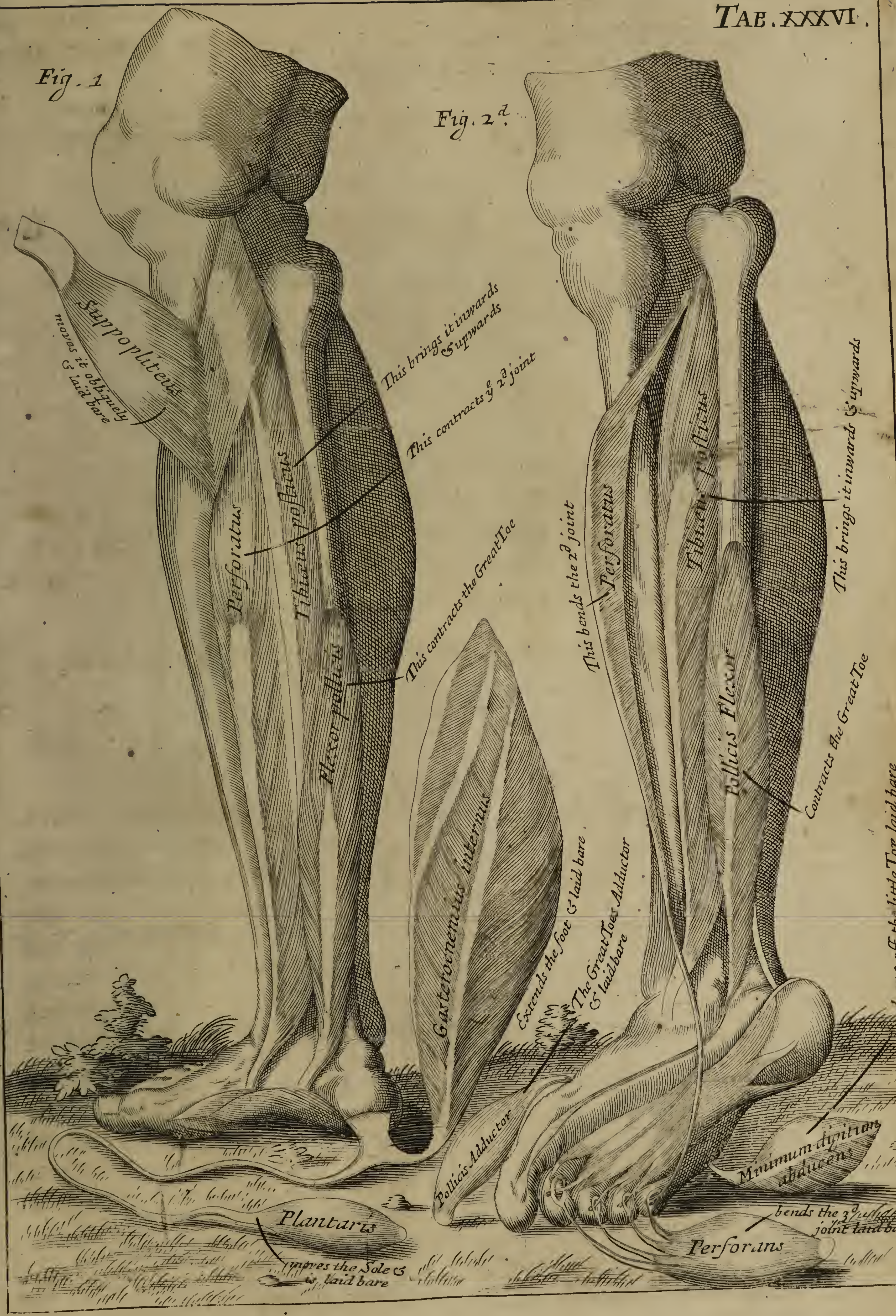


Fig. 1
Fig. 2d.
Suppopliteus
moves it obliquely & laid bare
This brings it inwards & upwards
This contracts ye 2d joint
Perforatus
Tibiæus posticus
Flexor pollicis
This contracts the Great Toe
Gasteroenemius internus
Extends the foot & laid bare
The Great Toes Adductor & laid bare
Pollicis Adductor
Plantaris
impres the Sole & is laid bare
This bends the 2d joint
Perforatus
Tibiæus posticus
This brings it inwards & upwards
Pollicis Flexor
Contracts the Great Toe
draws off the little Toe laid bare
Minimum digitum abducens
bends the 3d joint laid bare
Perforans

Extenſor Pollicis.

This extends the *Great Toe*

THE *Toes* of the *Foot*, as well as the *Fingers* of the *Hand*, are allowed three Sets of *Bones*, the great *Toe* excepted, which has only two; and the *Tendons* of the *Foot*, as well as thoſe of the *Hand* have various ſmall Bones allowed them, called *Seſamoidea*, being much like the *Seſaminſeeds*, or Seeds of *Indean Corn*, they being very different both in Shape and Size: Theſe Bones, as well as thoſe of the Hands, are alſo moved by the Benefit of their Muſcles; this *Extenſor* ariſeth fleſhy from the outſide of the *Tibia*, as *Veſalius* writes, where it parts from the *Fibula*, ſomewhat below its upper *Appendix*, and paſſing under the Annular Ligament of the *Tarſus*, in its progreſs along the upper part of the *Foot*, it inſerts it ſelf into the ſecond Bone of the *Great Toe*, in its upper part, and doth directly extend the ſame; ſometimes this *Tendon* hath been ſeen divided into two, one of which is inſerted into the laſt Joynt of the *Great Toe*, and the other in that *Os Metatarſi*, which lies under it:

Hiſtories

Valleriola, *Lib.* 4. *Obſ.* writes of a monſtruous Boy, about 15 years of age, who had ſeven Toes in either Foot, and the *Great Toe* was double in each Foot, and had alſo ſix Fingers in either Hand.

And *M. Janſonius* in Tom. 3. writes of a Monſter born, horrid in View, with the Head of an *Ape*, with a long Beard, and *Eagles* Claws at the ends of his Fingers and Toes, who ſo ſoon as he was born, dyed.

This you have at Tab XXXV. Fig. II. *and at* Tab. XXXVI.

Flexor primi & ſecundi Internodii Pollicis.

This bends the *great Toe.*

THIS ariſeth ſharp and fleſhy about the middle of the back part of the *Fibula*, with a double Set of fleſhy Fibres marching along, then running themſelves into a Tendon, as it paſſeth over the Joynt, and after that thro' a Channel in the inner part of the *Os Calcis*, is there implanted to the upper end of the ſecond Bone of the *Great Toe.*

This is ſhewn at Tab. XXXV. Fig. II. *it is laid bare*, *and at* Tab. XXXVI. Fig. I, II. *you have the ſame.*

Abductor Pollicis.

This brings the *Great Toe* inwards.

THIS takes its Name from its uſe, it ariſing fleſhy from the inner part of the *Os Calcis* laterally, and in its progreſs at the inſide of the Foot, it becometh tendinous, and joyneth with another fleſhy Origination at the *Os Cuneiformie*, both which making one Tendon, are inſerted to the *Os Seſamoides* of the great Toe, drawing the *Great Toe* laterally from the reſt.

This, you have at Tab. XXXV. Fig.I. *and at* Tab. XXXVIII. I, II, III.

Adductor Pollicis.

This brings the *Great Toe* inwards.

THIS ariſeth partly nervous, and partly fleſhy from the lower part of the *Os Cuneiforme*, and enlarging its ſelf to a round fleſhy Belly, then grows leſs, and afterwards becomes tendinous, obliquely inſerting its ſelf to the latter and inner part of the firſt Bone of the *Great Toe*, bringing it towards the reſt.

Hiſtory.

Coiter Obſ. Anat. pag. 109 writes, he has the Bone of the *Great Toe* made of one Bone, it being an old mans, in whom by reaſon of his Sedentary Life, and want of Motion, the Ligaments of his Bones were all perfectly turned oſſeal.

This you have at Tab. XXXVI. Fig. I. Tab. XXXVII. Fig. I, II. Tab. XXXVIII. Fig. I.

Extenſor Digitorum Longus.

This extends the 3d. *Joynt* of the *Toes.*

THIS ariſeth partly nervous, and partly fleſhy, from the upper *Appendix* of the *Tibia*, and then becoming fleſhy, it joyns it ſelf to the Ligament, that ties the *Tibia* to the *Fibula*, leſſning its ſelf in its progreſs along the *Fibula*; and marcheth under the *Annular Ligament* of the *Talus*, where it divides its ſelf into four Tendons, which do terminate in the upper part of the third or laſt Joynt of the four leſſer *Toes*, and the fifth of the *Os Metatarſi* of the other Toe, and is allowed to extend them.

This you have at Tab. XXXV. Fig. I. *and at* Tab. XXXVII.

Ex-

TAB. XXXVII.

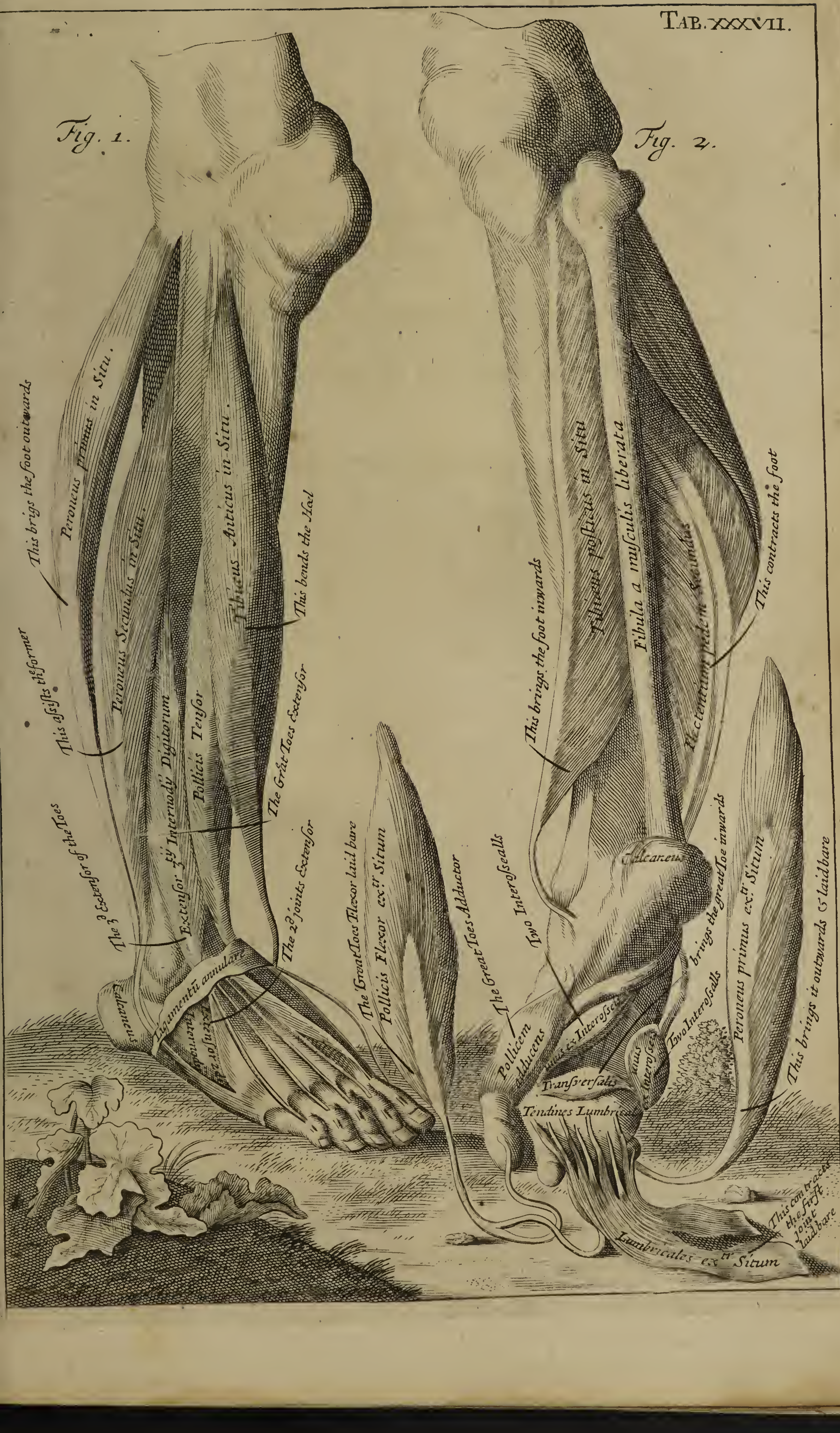


Fig. 1.
This brigs the foot outwards
Peroneus primus in Situ.
This assists the former
Peroneus Secundus in Situ.
Tibieus Anticus in Situ.
This bends the Heel
The 3d Extensor of the Toes
Extensor 3ty Internodii Digitorum
Pollicis Tensor
The Great Toes Extensor
The 2d joints Extensor
Calcaneus
Ligamentū annulare
The Great Toes Flexor laid bare
Pollicis Flexor extr. Situm
Fig. 2.
This brings the foot inwards
Tibieus posticus in Situ
Fibula a musculis liberata
Extensorum pedis in Secundus
This contracts the foot
The Great Toes Adductor
Two Interosealls
Calcaneus
brings the great Toe inwards
Two Interosealls
Peroneus primus extr. Situm
This brings it outwards & laid bare
Pollicem adducens
ex Interossei
Transversalis
ex Interossei
Tendines Lumbrici
Lumbricales extr. Situm
This contracts the first joint laid bare

Extenſor Digitorum Brevis.

THIS ariſeth broad and fleſhy from the tranſverſe Ligament that covers the top of the *Foot*, and then dilating its ſelf, it is divided into four fleſhy Portions, which afterwards are converted into as many Tendons marching over the firſt *Internode* of each leſſer *Toe* to their upper Inſertions, and they are planted to the upper part of the ſecond *Internodes*, interſecting the Tendons of the former.

This extends the 3d. *Joynt.*

This you have at Tab. *XXXV.* Fig. *I. and at* Tab. *XXXVII.* Fig. *II.*

Perforatus Pedis.

IT's ſo called upon its Tendons being perforated, and alſo *Flexor Secundi Internodii Digitorum*, from its Uſe and Situation, it ariſing fleſhy from the lower and inner part of the *Os Calcis*, and having marched half way through the Sole of the *Foot*, it does divide its ſelf into four fleſhy parts, which afterwards do become ſo many Tendons, being cleft or opened near their Terminations, for the admiſſion of the Entrance of the Tendons of the following Muſcle towards their proper Inſertions, theſe reaching no farther than the ſecond *Internodes* of each leſſer Toe.

This bends the *Toes* in the 2d. Joynts

This you have at Tab. *XXXVI.* Fig. *I, II.* Tab. *XXXVII.* Fig. *II. and at* Tab. *XXXVIII.* Fig. *I, II.*

Perforans Pedis.

IT hath its Name from its *Tendons* paſſing thro' the former, it ariſing fleſhy from the back part of the *Tibia*, then becoming tendinous, is carryed to the inner *Malleolus*, and running under the Ligament that proceeds from the lower *Appendix* of the *Tibia*, to the *Os Calcis*, having arrived at half its progreſs through the *Sole* of the Foot, doth divide its ſelf into four *Tendons*, which paſſing thro' the perforated *Tendons* of the former Muſcle, does terminate in the third Bone of every leſſer *Toe*.

This bends the *Toes* in the 3d. Joynts

This you have at Tab. XXXVI. Fig. I. *laid bare, and at* Tab. XXXVIII. Fig. II. *you have the ſame.*

Lumbricales, or *Vermiculares Pedis.*

Theſe bend the *Toes* in the 1ſt. *Joynt.*

THey have their Names from the reſemblance they bare with *Earth-worms*, both in their Make and Shape; as alſo *Flexores Primi Internodii Digitorum*, from their Situation and Uſes, they ariſing round and fleſhy from the *Tendons* of the *Perforans*, being inwardly inſerted by ſmall *Tendons* into the firſt Joynt of the leſſer *Toes*; but as I writ in my firſt Book on this ſubject, who ever well examines their Originations, will rather find they have their fleſhy ſubſtance ariſing from a fleſhy Maſs, found in the Sole of the Foot, or from that *Muſculous* Fleſh which is implanted in the inner Cavity of the *Os Calcis*, it there appearing fleſhy near half the Sole of the Foot, then becoming tendinous, does afterwards divide it ſelf into four diſtinct parts, which do afterwards become Tendons, at their Inſertions to the leſſer *Toes* laterally.

Theſe you have at Tab. *XXXVII. laid bare, and at* Tab. *XXXVIII.* Fig. *I, II.*

Abductor Minimi Digiti.

This brings the *little Toe* from the reſt.

THIS ariſeth nervous outwardly, and inwardly fleſhy, from the outward parts of the *Calcane Bone*, and having attained half its progreſs, it becomes tendinous on the outſide of the Foot; and there adjoyning with its other fleſhy part, which has its Origination from *Os Metatarſi* of the little Toe, they do make but one Tendon, and are inſerted into the firſt Bone of the little Toe at its outſide laterally.

This you at Tab. *XXXV.* Fig. *I.* Tab. *XXXVI.* Fig. *II.* Tab. *XXXVII.* Fig. *II. and at* Tab. *XXXVIII.* Fig. *I, II.*

Tranſverſalis Pedis.

This brings the ſmall *Toes* to the greater

THIS has its Name from its tranſverſe Origination, and doth ariſe tendinons from the *Os Seſamoides* of the great Toe inwards, and then growing fleſhy, is tranſverſly carried over the firſt Bone of the great Toe, it bringing the leſſer Toes towards it.

The Author of this Muſcle aſſigns it this Uſe, that upon drawing our great Toe towards our leſſer ones, we make a Hollowneſs in the Foot, for the better ſecuring our Feet in uneven places, this making our Steps more ſteady, it being formed like a Ligament to the Foot, to keep it from ſliding aſide, by drawing the *Metatarſe* and *Toes*, and fixing them to the Floor, which being aſſiſted by *Tibialis Anticus*, and *Peronæus Secundus*, which moving ſingly, the one is ſeen to carry the Foot outwards, and the other inwards; but when they act together, the *Tibialis Anticus* does keep the *Foot* from treading outwards, and the *Peronæus Secundus* prevents it from caſting too much inwards, whilſt this is held to give it a ſteadineſs in binding or keeping down the firſt *Internode* of the Bone of the *Toe*, in form of a Brace; ſo that the *Line* of Gravitation being carryed from one *Limb* to another, is ſeen to ſupport the weight of the Body, in order to a new Step in progreſſive Motion, in which the hinder *Limb* becomes the fore, and the fore the hinder, which hath a double Carriage in order to motion.

This you have at Tab. *XXXV.* Fig. *I.* Tab. *XXXVII.* Fig. *II.* *and at* Tab. *XXXVIII.* Fig. *I, II.*

Interoſſei Pedis.

These move the *Foot* obliquely.

THeſe have their Names from their Scituations among the Bones of the *Toes*, they ariſing fleſhy from the ſides of the Bones of the *Metatarſe* of the leſſer *Toes*, and becoming round Bellied, do grow tendinous at their Inſertions to the firſt *Internode* of every leſſer *Toe* laterally.

Hiſtory.

John Schenkius writes of *Thomas Schweigker*, about one and forty years Old, who was born without Arms, and performed many ingenious Tricks with his *Toes*; for with them he painted a Picture after the Life in a *Silver Medal*, by holding his *Pencil* between his *Toes*; and he ſhew a Copy ſo curiouſly writ with his *Toes*, and ſet off with ſuch fine Flouriſhes, that few *Writing-maſters* could mend it; beſides, he caſt Account ſo dexterouſly with Money, and with ſmall Stones, that he outdid his Neighbours, and that with that admirable Dexterity, that he was the Wonder of his age.

Wonderful therefore is the *Providence* and *Sagacity* of *Nature*, which the *Creator* of all things has made as a Mother to us all, for She in all Creatures with *diſtorted Members*, with *maimed*, or *debilitated Parts*, and other *Defects*, hath deſigned theſe ſomething beyond their natural Offices, and allowes them an extraordinary *Dexterity* and *Strength*, frequently purchaſed by long Uſe and Cuſtom; as if one might ſay, their Perfection doth not ſo much conſiſt in the diſtinction of their *Members*, as in their continual uſe of them: Or as if *Nature* had made one to anſwer, and account in every reſpect for the other, or rather allowed him a Compenſation of one for the want of the other, all which was as ſtrange as pleaſant to ſee; of whom were made theſe following Latine Verſes.

Mira fides! Pedibus dextre facit omnia Thomas,
Cui Natura Parens Brachia nulla dedit:
Namq; bibit Pedibus, Pedibus ſua Fercula ſumit,
Volvit & his Libros, præparat his Calamos;
Qui & Liturulas Pede tam bene pingere novit,
Artificis ſuperet Grammata ducta Manu:
Maximus hoc Cæſar *ſtupuit quondam Æmilianus,*
Donaq; ſcribenti largus honeſta dedit;
Omnia namq; poteſt vigilans Induſtria quodque,
Natura ipſa negat, perficit Ingenium.

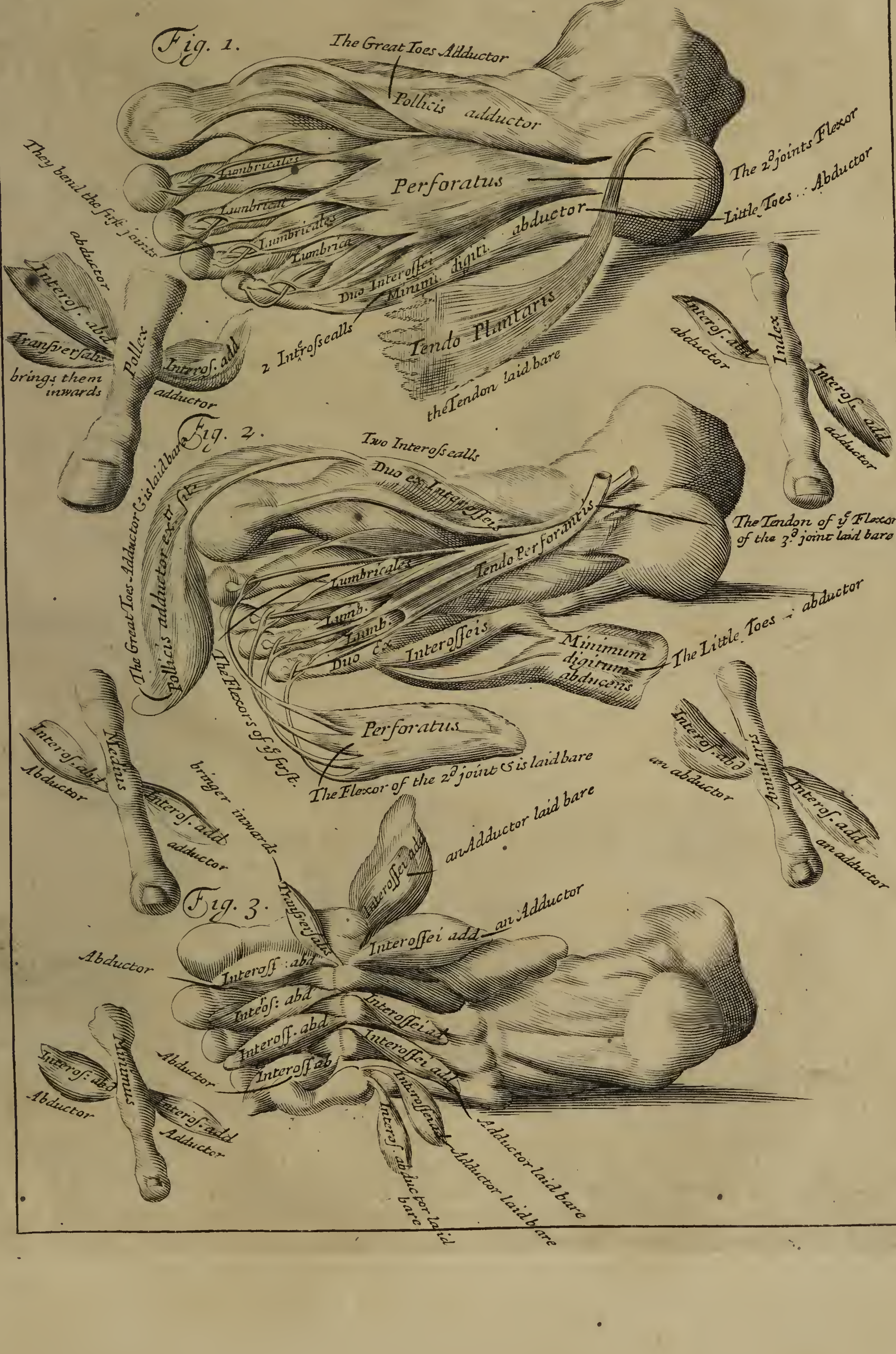
Which may be thus Engliſhed:

'Tis ſtrange! What *Thomas* with his Feet performs,
Who ne're from Nature had the Gift of Arms:
With's Feet he drinks, with them he takes his meat,
O'returns his Books, and makes his Pens with's Feet;
Such Letters with his *Toes* he could command,
As yet no Scribe e're finiſh'd with his Hand:
This, mighty *Cæſar* with juſt wonder view'd,
And with kind Gifts, the Artful Act purſu'd:
'Tis Induſtry can conquer all, and things
Which *Nature* ſcruples, *Art* to Action brings.

This you have at Tab. *XXXV.* Fig. *I. where you meet with Two* Interoſſeals, *and at* Tab. *XXXVII.* Fig. *II. you have two more, and at* Tab. *XXXVIII.* Fig. *II. IV. four others, at* Fig. *III. four* Abductors *and* Adductors, *and the two* Interoſſeals *of the* Great Toe, *and afterwards every one apart.*

Thus I have finiſhed this my *Muſcular Treatiſe*, every *Folio* whereof preſents us with a freſh repeated Theory of the Divine Goodneſs, in thus wonderfully contriving and forming all the various *Muſcles* belonging to the Humane Body, and allowing them their ſeveral Uſes and Offices, as the moſt proper Inſtruments and Machines of Motion and Action: To whoſe Great Name therefore be aſcribed, as is moſt due, all *Honour*, *Praiſe* and *Thankſgiving* both now and for evermore, *Amen.*

Finis Prælectionis Sextæ. TAB. XXXVIII



The TABLE, ſhewing the Reduction of the *MUSCLES*, each to their proper Place, Uſe, and Part.

THE *Forehead* is lifted up by *Frontalis*.
The *Hairy Scalp* is drawn backwards by *Corrugator* and *Occipitalis*.

- The *Eyebrows*,
  - The *Upper* is
    - Lifted up by *Elevator Palpabræ*,
    - Depreſſed by *Clauſor Superior*,
  - The *Nether* is lifted up by *Clauſor Inferior*.

- The *Eyes* are
  - Rightly mov'd
    - Upwards by *Elevator*,
    - Downwards by *Depreſſor*,
    - Inwards by *Adductor*,
    - Outwards by *Abductor*;
  - Obliquely
    - Downwards outwardly by *Obliquus Minor*,
    - Upwards internally by *Obliquus Major*.

- The *Noſe* is
  - Dilated by
    - *Elevator*,
    - *Dilatator*,
  - Contracted by *Conſtrictor*.

- The *Lips* are
  - Elevated by *Elevator*,
  - Drawn down ſideways by *Abductor*,
  - Brought downwards by *Depreſſor*,
  - Purſt up by *Sphincter Labiorum*.

- The *Cheeks* are
  - Drawn down by *Platyſma Myodes*, or *Quadratus*,
  - Drawn inwards by *Buccinator*, or *Conſtrictor*.

- The *Nether Mandible* is drawn
  - Upwards by *Temporalis*, or *Crotaphites*,
  - Downwards by *Digaſtricus*, or *Graphoides*;
  - Laterally by *Maſſeter*,
  - Forwards by *Pterygoideus Externus*,
  - Backwards by *Pterygoideus Internus*.

- The *Ears* are moved
  - Externally
    - Upwards by *Elevator*,
    - Downwards by *Depreſſor*,
    - Forwards by *Adductor*,
    - Backwards by *Abductor*.
  - Internally
    - by *Externus*, or *Laxator Externus*,
    - by *Internus*, or *Laxator Internus*.

- The *Tongue* is moved
  - In Conſtriction / In Dilatation
    - by *Lingualis*,
  - Forwards by *Geneigloſſus*,
  - Backwards by *Hipſilogloſſus*,
  - Upwards by *Mylogloſſus*,
  - Downwards by *Ceratogloſſus*,
  - Laterally by *Stylogloſſus*,

- The *Os Hyoides* is moved
  - Rightly
    - Upwards by
      - *Mylohyoideus*,
      - *Geneiohyoideus*,
    - Downwards by *Sternohyoideus*,
  - Obliquely
    - Upwards by *Styloceratohyoideus*,
    - Downwards by *Coracohyoideus*.

- The *Palate* is
  - Attolled by *Sphænopalatinus*,
  - Depreſſed by *Pterygopalatinus.*

- The *Fauces* are
  - Dilated by
    - *Sphænopharyngæus primus*,
    - *Sphænopharyngæus ſecundus*,
  - Contracted by
    - *Oeſophagæus*,
    - *Cephalopharyngæus*,
    - *Stylopharyngæus.*

- The *Larynx* is
  - dilated when the *Thyrois* is
    - Extended by
    - Contracted by
      - *Sternothyroideus*,
      - *Crycoarytænoides Lateralis*,
      - *Hyothyroideus*,
  - ſhut / opened while the *Arytænois* is
    - Contracted
      - Directly by *Thyroarytænoides*,
      - Obliquely inwards by *Arytænois*,
    - Extended
      - Rightly by *Crycoarytænoides Poſticus*,
      - Obliquely laterally by *Crycoarytænoides Lateralis.*

- The *Head* is
  - Contracted by
    - *Maſtoidæus*, if both work,
    - *Laterally*, if one works;
  - Extended by
    - *Splenius*, or *Triangularis*,
    - *Trigeminus*,
    - *Recti Majores*,
    - *Recti Minores.*

- Turned about by
  - *Obliqui Superiores*,
  - *Obliqui Inferiores.*

- The *Neck* is
  - Contracted by
    - *Longus*,
    - *Scalenus*,
  - Extended by
    - *Tranſverſalis*,
    - *Spinalis.*

- The *Thorax* is moved
  - Primarily by proper *Muſcles*, which do
    - Dilate in Breathing
      - Freely the *Diaphragme* alone contracted,
      - Coactively the *Diaphragme* and *Outward Intercoſtals*;
    - Conſtringe in Breathing
      - Freely the *Diaphragme* alone relaxed,
      - Coactively the *Diaphragme* and *Inward Intercoſtals*;
  - Extended by
    - *Latiſſimus Dorſi*,
    - *Semiſpinatus*,
    - *Sacrolumbalis*,
    - which are retain'd in place by
      - *Serratus Major* *Poſtici.*
      - *Serratus Minor* *Poſtici.*
  - Contracted by
    - *Muſculi Recti*, *Abdominis.*
    - *Obliqui Aſcendentes*, *Abdominis.*
  - Turned about by *Tranſverſi*,
  - Secondarily by the *Lumbal Muſcles*
    - Contracted by *Quadratus*,
    - Extended by *Sacer.*

- The *Abdomen* is compreſs'd
  - Laterally by
    - *Obliqui Deſcendentes,*
    - *Obliqui Aſcendentes,*
  - Forwards by *Recti,*
  - Downwards by
    - *Pyramidales,* or ſometimes by
    - *Tranſverſi.*
- The *Loins* are
  - Contracted by *Quadratus,*
  - Extended by *Sacer.*
- The *Teſticles* are raiſed by *Cremaſteres.*
- The *Bladder*
  - Retains by *Sphincter Veſicæ,*
  - Excreates by
    - *Detruſor Urinæ,*
    - *Pyramidales,*
    - *Obliqui Aſcendentes Abdominis.*
- The *Clitoris* is
  - Raiſed by *Muſculi Graafiani,*
  - Depreſſed by *Muſculus Labiorum Contractor.*
- The *Anus* is
  - Purſed up by *Sphincter Ani,*
  - Elevated by *Levatores Ani.*
- The *Penis* is improperly ſaid to be
  - Erected by *Erectores,* or *Directores;*
  - Accelerated by *Acceleratores.*
- The *Scapula* is moved
  - Variouſly by *Cucullaris,*
  - Upwards by *Levator Patientiæ,*
  - Backwards by *Rhomboides,*
  - Forwardly upwards by *Serratus minor,* } *Antici.*
  - Forwardly downwards by *Serratus major,* } *Antici.*
- The *Os Humeri* is moved
  - Forwards by *Pectoralis,*
  - Upwards by
    - *Deltois,*
    - *Octavus Humeri Placentini,*
  - Backwards by *Rotundus,*
  - Is carryed about towards the
    - External Part by
      - *Superſcapularis Superior,*
      - *Superſcapularis Inferior,*
      - *Nonus Humeri Placentini,*
    - Internal Part by *Subſcapularis.*
- The *Cubite* is
  - Extended by
    - *Gemellus Major,*
    - *Gemellus Minor,*
  - Contracted by
    - *Biceps,*
    - *Brachiæus,*
- The *Radius* is
  - Pronated by
    - *Quadratus,*
    - *Teres,*
  - Supinated by
    - *Longus,*
    - *Brevis.*
- The *Carpus* is
  - Contracted by
    - *Flexor Carpi Exterior,*
    - *Flexor Carpi Interior,*
  - Extended by
    - *Extenſor Carpi Exterior,*
    - *Extenſor Carpi Interior.*
- The *Fingers* are
  - Contracted by } *Internodii;*
    - *Flexor Primi,*
    - *Flexor Secundi,*
    - *Flexor Tertii,*
  - Extended by } *Extendentium Digitorum;*
    - *Primus,*
    - *Secundus,*
    - *Interoſſei,*

- Moved Laterally by
  - *Interoſſei,*
  - *Abductor Minimi,*
  - *Abductor Indicis.*

The *Thumb* is
- Contracted
  - Firſt, by
    - *Flexor primi Internodii,*
    - *Flexor ſecundi Internodii,*
  - Secondly, by *Flexores Internodii,*
    - *Primus*
    - *Secundus*
    - *Tertius*
    - *Quartus*
  - Thirdly, by *Tertii Internodii Flexor.*
- Extended by
  - *Extenſor primus,*
  - *Extenſor ſecundus.*
- Moved
  - Laterally internally by *Adductor,*
  - Outwardly by *Abductor.*

The *Thigh* is
- Extended Obliquely
  - Backwards by *Glutæus major,*
  - Forwards by *Glutæus medius,* and *Glutæus minimus.*
- Contracted
  - Directly by
    - *Pſoas Magnus,*
    - *Iliacus Internus.*
  - Obliquely by
    - *Triceps,*
    - *Lividus.*
- Moved about
  - Upwards by *Pyriformis,*
  - Inwards by *Obturator Externus,*
  - Outwards by *Obturator Internus,*
  - Backwards by *Quadrigiminus,* or *Quadratus.*

The *Leg* is
- Contracted by
  - *Sartorius,*
  - *Gracilis,*
  - *Seminervoſus,*
  - *Semimembranoſus,*
  - *Biceps,*
- Extended by
  - *Membranoſus,*
  - *Rectus,*
  - *Vaſtus*
    - *Externus,*
    - *Internus.*
- Obliquely moved by *Subpoplitæus.*

The *Ankle*
- is Extended by *Gaſterocnemius*
  - *Externus,*
  - *Internus.*
- Contracted by
  - *Tibialis Anticus,*
  - *Peronæus ſecundus.*
- Moved obliquely Lateral
  - Internally by *Tibiæus Poſticus,*
  - Externally by *Peronæus primus.*

The Four *Leſſer Toes* are
- Contracted by
  - *Perforans* in the Third
  - *Lumbricales* in the Firſt
  - *Perforatus* in the Second
  - Joynt.
- Extended by
  - *Interoſſei* in the Firſt Joynt,
  - *Secundi Internodii Tenſor,*
  - *Tertii Internodii Tenſor.*
- Obliquely moved by
  - *Interoſſei,*
  - *Minimi Digiti Abductor.*

The *Great Toe* is
- Contracted by *Flexor,*
- Extended by *Tenſor,*
- Obliquely moved by *Abductor.*

The Firſt of the *Toes* are kept together by *Tranſverſalis Placentini.*

The *Skin*
- Of the *Sole* of the *Foot* is moved by *Plantaris,*
- Of the *Palm* of the *Hand,* by
  - *Palmaris,*
  - *Caro Muſculoſa Quadrata.*

To the Ingenious
Orlando Bridgman, Eſquire,
SON of the Learned
William Bridgman, Eſquire,
One of the Clerks to His Majeſty's moſt Honourable Privy-Council; Both Fellows of the *R. S.*

SIR,

T*HE Noble Thoughts of the Great* Bernoullius, *about* Muſcular Motion, *command the Eſteem due to their Worth, without any Name; except an Alloy of* Engliſh, *by none of the beſt Hands, may want Protection: tho' I'm convinc'd, that the Sence of this Paper will make it welcome from any-body that can give the World its meaning. All I pretend to do in this Addreſs, is to ſhew, that I am glad of all Opportunities, even a Tranſlation its ſelf, to acknowledge the Obligations I have to your Family: but the rather, conſidering the mighty Improvements you daily make in* Mathematicks, *and other parts of uſeful Learning, to recommend to you the reading of theſe Diſquiſitions; if at any time they may have eſcap'd your Sight, while you are comparing the Performances of the German* Eruditi *in their* Acta Lipſiæ, *and the* Journals des Scavans, *with the Tranſactions of Our own Society: And I dare promiſe, you'll make Diſcoveries ſuitable to the Difficulties of the Neceſſary Subject of this Sheet. But if the* fermenting *of the* Animal Spirits *with the* Blood, *in producing the* motive Air, *ſhould prove too harſh to your nice Taſte; it is but ſuppoſing ſuch an* Air *(as is very reaſonable) without the way of making it, and the demonſtration will retain its whole force. I am ſincerely,*

Your moſt Affectionate

Humble Servant,

William Cockburn.

The Characters in uſe among Mathematicians, *and that are brought into this Paper, are,*

$=$ The mark of Equality.
$+$ Plus.
$-$ Minus.
$::$ Proportion.
M — Multiplication.

Mathematical Diſquiſitions concerning Muſcular Motion; *communicated in the* Lypſwick *Tranſactions by* John Bernoullius *M. D. at* Baſil.

1*ſt*, I Suppoſe, that the Fibres, which cauſe Muſcular Motion, ſhould repreſent a hollowed Cylinder, if they were diveſted of the tranſverſe ***Fibrillæ***, by which the ſaid Fibres are divided into a multitude of Spaces, whoſe Cavities communicate one with t'other through the whole length of the moving Fibre, becauſe of the looſe union of the tranſverſe Fibrils. 2*dly*, That there is a ſort of agitation of the Animal Spirits in the Brain, when the Soul inclines that any one Member of our Body ſhould be moved, ſo that by pinching the beginning of any Nerve, they force forwards the Spirituous Liquor contain'd in it; and by the ſame irritation of the beginning of the Nerve, a ſmall drop of Nervous Juice is thrown out of the extream part of the adjoyning Nerve by this ſlight and eaſie Vibration; which nevertheleſs could not happen by any other means than an actual concuſſion, becauſe the Spongy Subſtance of the Nerves ſupplies their want of a Valve. 3*dly*, When infinite numbers of drops are thrown, after this manner, out of the Orifices of the ſmall Nerves through the whole body of the Muſcle, (which is always bedew'd with Blood, like a Sponge) they do inſinuate themſelves into the Blood, by being determin'd into its thinner Particles by the force of their ſmall parts; by which the Blood is broke down into ſmaller Particles, and the condens'd Air that was confin'd in it finding vent; occaſions an ebullition, and the inflation of the Muſcles that attends it, by its expanſion. Theſe things being ſuppoſed, if we enquire, (1.) *about the nature of a Curve Line, according to which the moving Fibre is expanded*, it may be thus determin'd:

FIG. I. Let ABC be a Fibre; or, if you will, a flexible Thread faſten'd to the extremities of A and C, which in all its points B is drawn or propell'd perpendicularly to its bending by an equal and indefinitely ſmall force, which is here repreſented by the line BH; and let the Abſciſſa AF be $=$ to x its differential $Ff = dx$; the Applicate $FB = y$, its differential $GB = dy$; the Curve $AB = s$, its diff. $Bb = ds$; BH (the propelling power, and the multiplex of Bb) $= nds$, becauſe now the propelling power BH may be divided into two others that are lateral, one Horizontal BE, and the other Vertical, BD, which make the right Angle DE, whoſe Diagonal is the very $BH : BE$ will be $= ndy$ and $BD = ndx$, becauſe of the likeneſs of the Triangles BGb and BDH. But becauſe the ſuſtaining power in A is always the ſame wherefoever the thread is fixt, except in C, as 'tis

plain to any conſidering perſon; let it be put $= a$; but it is evident from the Mechanicks, that that power ſhould be as great as if, inſtead of the curve thread *A B*, there were other two ſtrait ones ſubſtituted touching and ty'd in the points *A* and *B*, which ſhould be drawn to the point of meeting in *I*, by two powers *I* and *K*, one Horizontal *L I*, and the other Vertical *K I*, the former whereof is equivalent to all the Horizontal powers *B E*, and this to all the Vertical *B D* taken together: But all in *B E* are equal to the whole $n\,d\,x$, which is $= n\,x$; therefore the power $L = n\,y$, and the power $K = n\,x$. Wherefore, that we may diſcover the partial power in *A*, which is only requir'd to ſuſtain the power *L*, we muſt ſay, (as Mr. *Varignon* teacheth us in his fundamental Propoſition about ſuſpended Weights) as the Sine of the Angle *A I B*, or its compliment to two Rights *K I B*, to the Sine of the Angle *M I B h e*, as *I M* is to *M G*, or as *G* is to *G B h e*. As $d\,x$ is to $d\,y$, ſo the power *L* or $n\,y$ is to the partial power in *A*, which therefore is found $= \frac{n\,y\,d\,y}{d\,x}$. Now, becauſe the direction of the power *K* is the tangent *K I*, this will all be ſuſtained by the point *A*; and therefore, that we may have the total and conſtant power in *A*, which we put $= a$, we muſt add the power *K*, or $n\,x$, to the partial power $\frac{n\,y\,d\,y}{d\,x}$; and ſo we ſhall make out this different Equation $\frac{n\,y\,d\,y}{d\,x} + n\,x = a$, which multiplied by $d\,x$, gives $n\,y\,d\,y + n\,x\,d\,x = a\,d\,x$, and by taking the Integrals we ſhall have half $n\,y\,y$ + half $n\,x\,x = a\,x$, or $y\,y + x\,x = \frac{2\,a\,x}{n}$; which Equation ſhows, that the propoſed Curve *A B C* is circular, whoſe *Radius* or *Semidiameter* $= \frac{1}{n}\,a$; which was to be found. Wherefore if a Muſcle were not ſtretch'd and drawn out in length by the reſiſtence it is to overcome, its little Machines ſhould be expanded in perfect and entire Circles: but becauſe it has always weights and reſiſtences of its own, and of the Bones, to remove, beſides thoſe that come from without; therefore it is that theſe Muſcular Machines, which we conſider as Planes, never obtain a circular figure entirely, but a figure made up of two equal Segments of the ſame Circle. By the ſame Propoſition of *Varignonius* the ſuſtaining power in *B*, or the power of firmneſs, which is requiſite that the Thread may not break, is found every where equal to the ſuſtaining power in *A*.

(2) *If we enquire into the proportion between the inflating and ſuſtaining Force, or requiſite Strength, of the Fibre,* *h. e.* if when the powers in n or *B H* do encreaſe or loſe, we would determine in what proportion the ſuſtaining powers in *A* or *B* do get or decreaſe, the *Radii* of the Circles ſtill remaining equal: Let *B H* be put $= m\,d\,s$, and the ſuſtaining power in *A* or $B = b$, and we ſhall have the Equation $y\,y + x\,x = \frac{2\,b\,x}{m}$; But becauſe the *Radii* are put equal, $\frac{b}{m}$ will be $= \frac{a}{n}$, and therefore $n\,m :: a\,b$, *h. e.* the ſuſtaining powers, or requiſite ſtrengths, of the Fibres are in the ſame *Ratio* with the inflating powers: which my Brother found out the ſame way; as we may ſee in the Rules which he hath publiſh'd in *May* 1692, in the *Lipſwick* Tranſactions concerning the *Curvatur* of a *Sail.*

(3) Theſe things being premiſed, we may eaſily reckon the *proportion* that's betwixt the *dilating power* and the *reſiſtences*; or how great an Elaſticity of motive Air is requiſite at every ſublevation of equal reſiſtences, upon which account almoſt all *Borellus*'s Works was made Let therefore *B E A D* be a Muſcular Machine, made up of two Segments of a Circle,

B D A and *B E A*, *C* the Center of the Arch *A E B*, and the *Radii C A*, *C E* being drawn, the former to the Extremity, and the other through
Fig. II. the middle of the Machine, ſo that *D E* may be the greateſt breadth which the greateſt length *A B*, or the Chord of the Arch *A E B*, or *A D B*, cuts in two in *R*: Now becauſe the Angle $EAC =$ to the right, which is $= RAC + ACR$, the Angle *E A R* will be $= ACR$, and therefore the Arch *A E* is the meaſure of the Angle *E A R*, or the double *B E A* the meaſure of the double *E A D*. Wherefore the half length of the Machine *h e*, of the Arch *A E* in 100000 equal parts, and half of the Angle of dilatation *E A R*, being given, we may find the ſublevation of the reſiſtence *z*, it being double to the exceſs by which the Arch *A E* is more than its right Sine *A R*; which is thus done: Say as the circumference of a Circle to the *Radius*, *h.e.* as 44 is to 7, ſo is the number of the degrees of the Circumference 360 to a fourth $57\frac{3}{11}$, $\frac{3}{11}$ which will be equal to the *Radius* in degrees. Then ſay as the number of degrees of the Angle *E A R*, or the Arch *E A* is to $57\frac{3}{11}$; ſo the number of the 100000 equal parts of the length of the Arch *E A* is to a fourth, which will be equal to the number of equal parts of the *Radius A C*, of which the Arch *E A* contains 100000: and hence we ſhall have the length of *A R* its ſelf, by ſaying, that as the whole Sine is to the Sine of the Angle *E A R*, or of the Arch *E A*, ſo the number of the parts of the *Radius A C* already found is to a fourth, for this fourth is equal to the number of equal parts of *A R* its ſelf, whereof the Arch *E A* contains 100000: and therefore the double exceſs of the Arch *A E* over and above the Sine *A R* now found, will be the deſir'd Sublevation of the Reſiſtence *Z*. *Q E I.*

(4) Now we have diſcover'd the Sublevations, we ſhall determine the *reſpective dilating force* after this manner. We put before (N° 1) the Curve power in any point, or rather in any differential of the Curve preſſing perpendicularly $= n\,ds$: therefore the dilating power, or the abſolute Force of the Elaſticity of the motive Air, whereby the Sides of the Machine are dilated, is expreſt by n, but by putting the ſuſtaining Force in any point of the Thread $= a$, we found before that the *Radius* of the Arch of the Circle to which the Thread does bend to be $= \frac{1}{n}a$. Now, becauſe by the mention'd Propoſition of *Varignonius* the Reſiſtence *Z* is to the Suſtaining power in *B*, whoſe direction is the Tangent *B F*, as the Sine of the Angle E B D to the Sine of the Angle E B R, therefore is $a = \frac{z\,M\,\text{Sin. of } EBR}{\text{Sin. of } EBD}$ and ſo the value of a being ſubſtituted in its place in the quantity $\frac{1}{n}a$, we ſhall have the *Radius* (found by the mention'd way, which therefore we ſhall call r) $= \frac{z}{n}\,\frac{M \text{ of the Sine } EBR}{M \text{ of the Sine } EBD}$; and therefore the abſolute force of the Elaſticity of the motive Air $n = \frac{z}{r}\,\frac{M \text{ of the Sine } EBR}{M \text{ of the Sine } EBD}$: and conſequently the force, by which the half-ſide of the Machine is preſt, *h. e.* $n\,AE$, will be $= \frac{100000\,z\,M\,\text{Sin. } EBR}{r\,M\,\text{Sin. } EBD}$. By means of this Calculation, I have contriv'd a Table like that *Borellus* made for his Hypotheſis; which, if compar'd with mine, there may be ſeen a vaſt difference both as to the moving Force and the Sublevations: for, he makes them every where either more or leſs than they ſhould be.

Now it is evident, by this Table, that a Muſcular Bladder A E B D can never be entirely of a Circular Figure, becauſe the abſolute force of the Elaſticity ſhould be infinitely greater than the Reſiſtence, which cannot be; and becauſe the greateſt contraction of the Machine, or ſublevation of Reſiſtence, which is not equal to 72728 parts of thoſe of which the half length of the ſide contains 100000. It is alſo evident, that no Machine can be contracted to its third part, in its greateſt diſtention; all which muſt be thought as ſaid of a Muſcle. Hence 'tis obvious too, that a very ſmall ebullition in Muſcles can produce their immenſe and incredible energy; becauſe, in the beginning of the inflation, when the angle of the half-dilatation E A R is very acute, the Reſiſtence bears a very great proportion to the abſolute force of the Elaſticity of the motive Air: ſince if we ſuppoſe the Angle E A R of 30 minutes, the Reſiſtence is to the power of the Elaſticity, as 22900000 to 1; ſo that the leaſt inflation of Muſcles is able to counterbalance any great Reſiſtence, and that therefore a very tender Infant may raiſe any weight whatſoever: but the Sublevation becomes the more inſenſible, the greater the Reſiſtence is than the motive power of the Elaſticity.

(4) *When we would know the quantities of Animal Spirits which are expended on every Reſiſtence, while the ſublevation of Reſiſtences continue the ſame, they may be found in this way.*

The inflating Powers, *h. e.* the abſolute Powers of Elaſticities of motive Air in equal Circles are proportional to the ſuſtaining Powers by nz: But becauſe (by *Verignonius*'s Propoſition) the ſuſtaining Powers are in the *Ratio* of the Reſiſtences Z, the Reſiſtences muſt alſo be proportional to the Elaſticities, while the Sublevation of the Reſiſtence remains; or the Angle E B D is always the ſame. Moreover, we take it for granted, that the quantities of the motive Air, *h. e.* that the Denſities of the ſame volume of motive Air, and the quantities of Animal Spirits, or Nervous Juice, are always in the ſame proportion; *h. e.* that a double, treble, or quadruple quantity of Nervous Juice does excite thicker motive Air, in a double, treble, and a quadruple proportion. Therefore the whole matter ſhould be concluded, if we knew how the Elaſticities encreaſe while the Denſities do. This we may ſearch after this way.

In a determined Volume a. I conceive, that the Particles of Air take up the ſpace b, and that the *Materia Subtilis*, the remainer of the Volume, poſſeſſes the Space $a - b$. Now I conceive another quantity of Elaſtical air C in an equal volume a, ſo that the remaining Space of the *Materia Subtilis* may be $a - c$; and therefore, by the Demonſtrations my Brother has made in the 97th Page of his Book *de Gravitate Æther*: the Elaſticity of the air of the firſt Volume is to the Elaſticity of the ſecond, in a compound *Ratio*, of a reciprocal proportion of the Spaces poſſeſt by the *Materia Subtilis*, and a direct one of Spaces fill'd with Air, as, *viz.* $ab - bc$ is to $ac - bc$; but the denſity of the firſt is to the denſity of the ſecond in a direct *ratio* of airy Spaces, as, *viz.* b to c. If therefore we conſtruct a Curve ACD to the Axis of AF of this ſort, that AB in the Axis being taken $= a$ and the Applicates DF, CE being drawn, the right Angle under BE and AF may be to the right Angle under B F and A E, as D F to C E, and if the Abſciſſa's A E, A F be taken for the denſities of the Air contain'd in the Volume expreſt by the given line A B, the Applicates D F, C E will be its Elaſticities. If we enquire analytically for an Equation that may expreſs the nature of the Curve A C D, let us put the given line $AB = a$, and another taken at will $BF = f$, $DF = g$, the Abſciſſa AE $=$ to x, and the Applicate E C $= y$, and we ſhall find this Equation $fgx = aay -$ F I G. III.

$afy - axy + fxy$, which ſhews that the requir'd Curve is an Hyperbola, and the Applicate B G in B is an Infinite, and therefore the Aſymptoton of the Hyperbola; whoſe Center may be had by producing the Aſymptoton G B to R, ſo that B R may be a fourth Proportional to A F, F D, and B F; the tranſverſe half-axis is equal to the mean proportional between B R and the double of A B. Hence it is evident, that the Elaſticities, but eſpecially in a very condens'd Air, do encreaſe in a far greater proportion than the Denſities themſelves; for the Elaſticity becomes at length Infinite, when the Denſity becomes as great as it can be, and yet is no more than finite.

Now ſince we have taken the Denſities of motive Air of the ſame volume proportional to the quantities of animal Spirits expended in producing while they fermented with the Blood, and the Elaſticities are proportional to the Reſiſtences, we may conclude, that the very ſame Hyperbola A C D does alſo determine the relation of Reſiſtencies to the quantities of expended Spirits, *h. e.* if C E, D F deſign the Reſiſtencies, A E, A F will denote the quantities of expended Spirits. Now let the volume of the Muſcular Machine, or, which is the ſame thing, let the volume of all the Machines of a Muſcle taken together (which volume is repreſented by A B) be of ten parts, B F or $f = 1$, F D or $g = 100000$, and if the quantity of animal Spirits, *h. e.* A E or x be of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 parts, it will be found by that Equation of the Curve, C E or y; that is, that the weight to be rais'd is reſpectively of 1234, 2778, 4762, 7407, 11111, 16666, 25926, 44444, 100000 *infinite* parts. This is the reaſon that great weights (proportionate to our Strength) may be raiſed to the ſame height with little more trouble than ſmall ones: for I am of opinion, that the whole difficulty about the performing of animal Motions proceeds entirely from the waſte of animal Spirits; but the Spirits are conſumed in a far leſſer proportion than the Weights to be rais'd. In example; if we are to raiſe any thing of a double weight, it is not requiſite that there be a double quantity of animal Spirits employ'd; as 'tis evident by this calculation; whereby we find by the help of a quantity of animal Spirits, which is as 8, there may be a weight rais'd four times bigger than another quantity which is as 5; tho' the waſte in that caſe be not indeed twice greater than the waſte in this, for they are as 8 to 5. Therefore the Difficulties alſo which we find in lifting up Weights are in this proportion.

The Figures *are on the next ſide ſhown.*

AN APPENDIX OF THE HEART and its USE:

WITH THE CIRCULATION of the BLOOD, and the Parts of which the *Sanguinary Maſs* is made, *&c.*

THE Great *Architectonical* Uſe of this Principal Part, is to convey the Blood to every Part of the Body, for the vivifying and nouriſhing of the whole, which you ſhall be beſt able to underſtand, when we ſhall have declared the Manner of this Conveyance, and the Nature of that which is conveyed.

We ſhall therefore firſt begin, with ſhewing the Certainty of the Truth of the *Circulation* of the *Blood*, wrought by the Motion of the *Heart*, then ſhall declare what the Nature of *Blood* is, of what parts its *Maſs* doth conſiſt, how it warms and nouriſheth the whole, and conſequently in what Life is properly ſaid to conſiſt: The Action and Function of every part being beſt underſtood by its natural Figure, Frame and Conſtitution.

That therefore we may demonſtrate the proper Operation of the *Heart*, We muſt curiouſly obſerve the Parts and Veſſels belonging to it, and not only of the *Heart*, but of the *Lungs* alſo, which for this purpoſe are faſtened to it, and therefore ought to be conſidered with it: Neither do I think there hath been any greater reaſon of the long Concealment of the Circulation, from the Diſcovery and Knowledge of man, than the looking upon the *Heart* and *Lungs* as parts of diſtinct Concernments; for altho' the Circulation be as true, and ſometimes more manifeſt in ſuch Animals as have no proper *Lungs* faſtened to the *Heart*, as in Fiſhes: Yet in thoſe Animals with *Lungs*, there can be no accurate Conſideration of the *Heart*, without them; becauſe there is no Communication of one *Ventricle* of the *Heart* with the other, but by and thro' them: Let us therefore firſt conſider the Frame and Structure of the *Heart*, together with the *Veſſels* diſſeminated

minated through the *Lungs*, which are affixed and impland ed into it.

The *Heart* of its ſelf is a firm *Muſcular*; that is, a fleſhy and fibrous part, not wholly ſolid, but having two Cavities allowed it, commonly called the *Right* and *Left Ventricles*; Again, being the Orifice of the *Vena Arterioſa*, is immediately faſtned to the ſame *Right Ventricle*, and the *Valves* planted in the Orifice of this Veſſel, are properly framed and adapted for the Admiſſion of any thing out of this *Ventricle*, and hindring the return of any thing into it: Therefore it is moſt evident, that the *Blood* which paſſed out of the *Cava* into the *Right Ventricle*, ſhould paſs out of this *Ventricle*, into the *Vena Arterioſa*.

Thirdly, Being the Orifice of the *Arteria Venoſa*, is faſtned by the *Left Auricle*, to the *Left Ventricle* of the *Heart*, and the *Valves* planted in that *Ventricle*, are framed for the Admiſſion of any thing that comes that way, and hindring all Regurgitation backwards: It is likewiſe here evident, that out of the very Frame and Contexture of the part, that what *Blood* paſſeth out of the *Right Ventricle*, through the *Vena Arterioſa* into the *Lungs*, ſhould alſo paſs out of the *Lungs*, through the *Arteria Venoſa*, into the *Left* Ventricle of the Heart.

Laſtly, Being the Orifice of the *Arteria Aorta*, or Great *Artery*, is immediately affixed to the *Left Ventricle*, and the *Valves* implanted in it, are ſo framed on purpoſe to admit any thing out of the *Ventricle* into the *Artery*, and to hinder all Paſſage out of the *Artery* into the ſaid *Ventricle*; it is likewiſe moſt evident, that what *Blood* paſſeth out of the *Arteria Venoſa* into the left *Ventricle*, be conveyed out of the left *Ventricle* into the *Aorta*, or Great *Artery*: And thus have we clearly brought the Blood out of the *Vena Cava*, through moſt manifeſt open Channels, framed by Nature her ſelf, through the *Ventricles* of the *Heart*, and the Veſſels of the *Lungs* into the Great *Artery* or *Aorta*.

That the *Blood* may thus march, and that Nature deſign'd it ſhould do ſo, is hence ſufficiently ſhewn even from the Conſtruction of the Parts; and that it muſt neceſſarily do ſo, and that it actually goes this round, is next further to be demonſtrated.

At every *Pulſe* of the *Heart*, there is a ſmall Quantity of Blood forced out of the *Left Ventricle* into the *Aorta*, and this is manifeſt by moſt certain Experience, now the *Pulſes* of the *Heart* are ſo many, and the quantity of *Blood* ſo conſiderable that is expelled, that it cannot be denied, but there is in leſs ſpace than an Hour, more *Blood* ſent out of the left *Ventricle* into the *Aorta*, than the quantity of the whole *Maſs* of Blood in the Body amounts to; but whatſoever cometh into the left *Ventricle*, muſt come out of the *Arteria Venoſa*, and whatſoever comes out of the *Arteria Venoſa*, muſt firſt come thro' the *Vena Arterioſa*, whatſoever paſſeth through that, muſt firſt come out of the *Right Ventricle*; and whatſoever comes thence, muſt have its paſſage from the *Vena Cava*, as we have before demonſtrated out of the Frame of the parts: Therefore *à Primo ad Ultimum*, whatſoever Quantity of Blood cometh into the *Aorta*, muſt conſequently come out of the *Cava*, but a quantity exceeding the whole Maſs of Blood cometh into the *Aorta*, in the ſpace of an Hour; therefore the ſame Blood muſt return out of the Great *Artery* into the *Vena Cava*, which is the Circulation we mentioned, and which we contend for. And thus far for the Truth and Certainty of it; now follows the Manner of this Circulation.

And although the Manner and Nature of Circulation, (as the Circle its ſelf) admits of no Beginning, yet for Doctrin's Sake, we muſt begin ſomewhere, and for Perſpicuity's Sake, we ſhall begin where motion doth laſt appear at the left *Auricle*.

The Blood in the *Vena Cava*, is by the Right *Auricle* forced into the Right *Ventricle* of the Heart; the Heart by its *Syſtole* or Contraction, forceth the Blood out of the Right *Ventricle* into the *Vena Arterioſa*; by Vertue of which Stroke, it paſſeth through the Branches all over through the Body of the *Lungs*, and ſo into the Branches of the *Arteria Venoſa*, through which it is conveyed to the left *Auricle*, each of theſe *Ventricles* having two large Veſſels annext to it; one by which it receives, the other by which it diſchargeth the Blood.

The Right Ventricle hath immediately faſtned to it, the right Auricle, which is as it were the Extremity of the *Vena Cava*; by which the Blood is conſtantly conveyed into it; beſides which, it hath a large Orifice of the *Vena Arterioſa* annext to it, by which it diſchargeth the Blood into the *Lungs*, which it received from the aboveſaid *Auricle*: In like Manner the left *Ventricle* hath annext to it the left *Auricle*, which is as it were the Extremity of the *Arteria Vena*, thro' which it receives the *Blood* out of the *Lungs*; beſides which, it hath a large Orifice of the *Aorta* annext to it, by which it diſpenſeth and diſchargeth into the *Arteries* all the *Blood* which is received from the *Lungs*; but the uſe of all theſe *Veſſels* will more clearly appear, if we conſider the ſtrange Artifice of certain *Valves*, or little *Flood-gates* planted at theſe their Orifices.

Theſe *Valves* are of two ſorts, *Tricuſpidal*, and *Sygmoidal*; the *Tricuſpidal Valves* being planted in the *Ventricles* for the Admiſſion of *Blood* into the *Heart*, and hindring its Reflux into the *Veins*. The *Sygmoidal* are planted in the *Arteries* for the Admittance of *Blood* out of the *Ventricles* into the *Arteries*, and preventing its return out of the *Arteries* into the *Ventricles*.

Having thus conſidered the natural Frame and Structure of *Ventricles*, *Veſſels* and *Valves*, we ſhall now more eaſily demonſtrate the *Circulation* of the *Blood*, and how it is naturally performed. The firſt Way being the *Vena Cava* by the *Right Auricle* to the *Right Ventricle* of the *Heart*, and the *Valves* planted in the *Ventricle*, are framed for the Admiſſion of any thing into it, and preventing all Regurgitation back: Therefore it is moſt evident, even from the very Frame of the part, that the *Blood* paſſeth out of the *Vena Cava* into the *Right Ventricle* of the *Heart*, and is thence diſperſed and diſpatcht into the left *Ventricle*, from whence by the *Hearts* Contraction, it is forced into the *Trunk* of the *Great Artery*, and by the Branches of that *Artery*, into the whole Habit, and all the parts of the Body; in all which parts there being Extremities of Veins, anſwering to the Extremities of the *Arteries* in the ſame manner, as the Extremities of the *Arteria Venoſa* does anſwer the Extremities of the *Vena Arterioſa* in the *Lungs*.

The *Blood* is conveyed out of the Capillary Branches to the *Arteries* into the Capillary Branches of the *Veins*, and through theſe into the larger *Veſſels*, till it arrives at the Trunk of the *Vena Cava*, whence it is ſent back again into the *Right Ventricle* of the *Heart*; from thence, thro' the *Lungs*, into the left *Ventricle*, and ſo into the *Aorta*, and ſo about perpetually; and this is the manner of the *Circulation*: And thus have we abſolved the firſt part of our Diſcourſe.

In the ſecond part, we are to conſider the Nature of that which is thus circulated, and the end of *Circulation*, which is the Life of the whole.

That which is thus circulated, we commonly call the Maſs of *Blood*, which I ſhall not diſtinguiſh with the *Ancient Phyſicians* into the four Humours; but rather content my ſelf with that Diviſion Nature her ſelf maketh, when the *Blood* is out of the Body. In the Body of a ſound Man, take what quantity you pleaſe away by *Phlebotomy*, and let it ſtand ſome few hours, and in it you will find two diſtinct Subſtances, of different Colours, Taſts, Qualities and Operations; the one a dark, and turned towards black; the other of a darkiſh white, or watery Colour. Theſe two in the *Blood*, were blended and mingled together, inſomuch that all the *Whitiſh Liquor* was in a manner abſorbed with the *Tincture* of a deep *Red*; of theſe, one is ſaid and allowed to be the proper Subſtance of the *Blood*; the other the *Chile*, preſerved in the *Blood*, prepared by it, and circulated with it, for the Nouriſhment of every part: And that it is of this Nature, is evident; becauſe, ſet it upon the Fire, and it will not evaporate, as does the *Serum*, or the *Urine*, but will rather coagulate, and grow to the Subſtance of the ſame Conſiſtence, Smell, and Taſt, with the white of a roaſted Egg; which is the true Connatural Nouriſhment of the parts, whoſe Colour and Conſtitution are the ſame.

This *Succus Nutritius*, mingled, warmed, and ſubtilized by the *Blood*, ſo much as is neceſſary for preſervation of the *Blood*, is *ſanguified*, (that is) conveyed into the Subſtance of *Blood*, the reſt is conveyed with the Blood to the Extremities of the *Arteries*, and ſo paſt to the Habit of the Body in every part, which taking into it ſo much as is to be aſſimilated to the part, ſends the reſt with the *Blood* into the *Capillary Veins*, and ſo thro' the great *Veſſels* to the *Heart*, to be conveyed in the ſame Manner for the further Nouriſhment of the parts. The other part of the *Maſs*, is the *Blood* its ſelf, the Fountain and Original of Life, the *Primum Vivens*, and the *Ultimum Moriens*: This from its beginning having Life in its ſelf, by the Addition of this *Nutrimental Juyce*; and without which, the *Artificer* can do nothing, becoming the *Architect* of his own Houſe and Frame, every part being fitted for its own Reception and Habitation: Now, as this hath a *Local Motion* by Way of *Circulation*, by which it provides for the *Circulation* of the parts, ſo hath it alſo a *Vital* one, by which it preſerves its ſelf.

This Vital Motion is a conſtant Fermentation or Working of the Blood, by which all the moſt Minute parts are ſecretly di-

divided for the Reception of what is proper for it, and Expulſion, Amandation, and caſting off whatever is obnoxious or injurious to it; but this ſecret Agitation of its ſelf, and *Atomical* Diviſion of the *Minimæ Particulæ* preſerves it in its uſual Vigour, and ſo long as its Fluidity continues; as the proper Effect of this its Vitality, it becometh brisk and lively, it cauſing the lively part of the *Blood* to nouriſh and cheriſh the whole.

But alas, this Life is not immortal! Nor can the Great Architect, according to ſecond Cauſes, make ſuch a Houſe as ſhall never fall on its own Head, ſince that by which he firſt builds, and afterwards repairs, is nothing elſe but the *Nutrimental Juyce*, Liquor, or moiſt Subſtance which is mingled, and as it were incorporated with the Blood, which muſt intimately penetrate, and enter the part which it is to Nouriſh: Now the Parts of the Body made and kept up by it, are ſo long capable of Increaſe and Nouriſhment, as they continue in them a Conſiſtence fit to receive ſuch a Moiſture, and no longer: And whereas the Bones at firſt were both moiſt and ſupple, as were other Parts, which by length of time grows to ſuch a Stability, Firmneſs, and conſequently, Dryneſs, that they do not admit any longer Nutrimental Juyce into them, or their proper Subſtance, whereby they ſeem to obſtruct and hinder the further Growth of the Animal; and for the future, they ſtand in the Body more like Timber in a Houſe, than as Trees in the Ground, as they formerly did; ſo other Parts of the Body after full Age, do grow ſomewhat dryer and cloſer, and ſo conſequently do make a greater Reſiſtance towards their own Nouriſhment: For when the Skin, by reaſon of its Propinquity to the Air, does firſt grow dry, cloſe, and ſhrivell'd, as we ſee in Decrepit Old Age: So we may alſo conceive, that the Membranes of all the inward parts proportionally do the ſame: And therefore, the *Blood* moving about to every part, does not find an admittance for that Dew of Life which it carries along with it; and yet ſo long as the *Blood* does move, there is ſaid Life ſtill to remain in it, altho' nothing elſe could be ſo ſaid to live but its ſelf.

But at the laſt, even the *Blood* its ſelf fails of the quickneſs of its vital Motion, and not being longer able, nimbly to relieve its ſelf by a ſubtile Diviſion of its parts, it at length becomes fibrous, and gets into its ſelf a kind of dryneſs, which makes it unfit and uncapable of receiving its own Nouriſhment; and for want of its vital Fermentation it formerly enjoyed it grows more dry and more firm, it not admitting into it its former Liquidity, to reſolve or bedew its parts; whereby it becomes ſo fibrous, as not to allow them any further Capacity of making uſe of their own proper *Menſtruum*: So that upon the failure of this *Vital*, the *Local Motion* muſt conſequently ceaſe, whereby all the parts become deprived of their vital Influence: Whence follows a natural Death.

Thus have I humbly diſpatch'd the Second Part of the Diſcourſe, concerning the Nature of the *Maſs of Blood*, and that wherein *Vitality* its ſelf conſiſts, by which at laſt we clearly underſtand the great Uſe and Function of the *Heart*.

And ſeeing all the Parts do receive their vital Influence from the *Blood*, and this *Blood* (the Seat of Life) ſerves its ſelf by its own vital Motion; and ſeeing this *Blood* cannot conſtantly be tranſmitted into the Parts, but by *Local Motion*, and this Motion cannot be continued but by a Forceable Impulſe, therefore *Nature* muſt of neceſſity make ſome part of the Body to drive it forwards, which Part muſt neceſſarily have ſome Cavities belonging to it, or allowed it, Firſt to contain; then ſome *Veſſels* to receive, as does the Ciſtern and Pipes; and Thirdly, Strength to propel or drive out: And ſuch a Part as this, in every reſpect is the *Heart*, which is furniſhed with *Ventricles* to contain, with Veſſels annext to it, to Convey and Receive, and with a firm *Muſcular Body*, to propel the *Blood*. Thus the Action of the *Heart*, is its proper Contraction by which it makes way for the Propulſion or driving forward of the *Blood* for its Uſe, and a conſtant *Circulation*, as alſo for the Vivifying and Nouriſhment of the whole Body.

This Accurate and Conciſe Diſcourſe of the Heart, *and its* Uſe, *as alſo of the* Circulation of the Blood, *and the parts of which the* Sanguinary Maſs *is made, was Written by the Late Learned* Dr. Lower, *and Preſented to a Perſon of Quality, who was pleaſed to favour me therewith, in order to have it added to this my* Graphical Diſcourſe *of the* Muſcles.

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